



USAID
FROM THE AMERICAN PEOPLE

WEST AFRICA

**TRADE
HUB**
WEST AFRICA

TRADE HUB AND AFRICAN PARTNERS NETWORK

VALUE CHAIN ASSESSMENT REPORT: HONEY AND BEESWAX

Contract No.: AID-624-C-13-00002-00

May 2014

This publication was produced for review by the United States Agency for International Development. It was prepared by Abt Associates Inc. for the Trade Hub and African Partners Network.

Recommended Citation: Trade Hub and African Partners Network. “Value Chain Assessment Report: Honey and Beeswax.” Prepared for the Trade Hub and African Partners Network by Abt Associates Inc., Bethesda, MD, in collaboration with J.E. Austin Associates, Arlington, VA, May 2014.

Submitted to: Brinton Bohling, Chief, Office of Trade and Investment
(+233) 30-274-1317
No. 24 Fourth Circular Rd, Cantonments
Accra, Ghana



Abt Associates Inc. | 4550 Montgomery Avenue | Suite 800 North |
Bethesda, Maryland 20814 | T. 301.347.5000 | F. 301.913.9061 |
www.abtassociates.com

With:

Banyan Global
J.E. Austin Associates

Kanava International
SSG Advisors

TRADE HUB AND AFRICAN PARTNERS NETWORK

VALUE CHAIN ASSESSMENT REPORT: HONEY AND BEESWAX VALUE CHAIN

Contract No.: AID-624-C-13-00002-00

DISCLAIMER

The authors' views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development (USAID) or the United States Government.

CONTENTS

- Acronyms.....iv**
- Acknowledgements.....v**
- 1. Introduction and Background..... 1**
 - 1.1 Honey and Beeswax Value Chain..... 1
 - 1.2 Value Chain Assessment..... 1
 - 1.3 About The Trade Hub and African Partners Network..... 1
- 2. Methodology..... 5**
 - 2.1 Value Chain Assessment Process and Subsequent Steps..... 5
 - 2.2 Sources of Information 6
 - 2.3 Data Limitations..... 6
- 3. Description of the Value Chain 7**
 - 3.1 Products Included in the Value Chain 7
 - 3.2 Value Chain Map..... 7
 - 3.3 Product Flow Map..... 8
 - 3.4 honey and beeswax Data and Information..... 9
 - 3.5 Main Actors in the Value Chain 11
 - 3.5.1 Description of the Value Chain Actors 11
 - 3.5.2 Relationships Between Key Actors 12
 - 3.5.3 Opportunities and Issues 12
- 4. Discussion of Value Chain Assessment Criteria..... 14**
 - 4.1 Market Information..... 14
 - 4.2 Contribution to Economic Growth..... 14
 - 4.2.1 Potential to Increase Trade..... 14
 - 4.2.2 Potential to Create Jobs..... 15
 - 4.2.3 Potential to Attract Investments..... 15
 - 4.2.4 Potential to Generate Value Addition 16
 - 4.2.5 Potential to Generate Market-Based Improvements in Production Yields 16
 - 4.3 Impact on Food Security..... 17
 - 4.4 Social Impact..... 17
 - 4.5 Competitiveness 17
 - 4.6 Factors that Would Support Upgrading 17

4.6.1	Champions for Change.....	18
4.6.2	access to Finance.....	18
4.6.3	Productive Infrastructure.....	19
4.6.4	Synergies with Existing Programs.....	19
4.6.5	Policy Environment.....	19
4.7	Climate Resilience and Environmental Sustainability.....	19
4.8	Other Hurdles to Success.....	19
4.9	SWOT Analysis.....	20
5.	Vision and Upgrading Strategy.....	22
5.1	Vision.....	22
5.2	Upgrading Strategy.....	22
5.3	Risks and Mitigation.....	23
6.	Additional Information Needed.....	24
	Annex 1: Bibliography.....	25
	Annex 2: Revealed Comparative Advantage.....	27

LIST OF TABLES

Table 1: Trade Hub Highest Outcome-Level Results..... 3

Table 2: Steps in Value Chain Assessment and Final Selection..... 5

Table 3: European Union Definitions of Honey 7

Table 4: Details of Fixed Asset Investment Requirements for Honey Processing Firms in Ghana 16

LIST OF FIGURES

Figure 1: The Honey Value Chain in Ethiopia..... 8

Figure 2: Honey Product Flow..... 9

Figure 3: Top Exports, Honey, Natural, 2011 10

Figure 4: Top Production, Beeswax, 2012..... 11

Figure 5: World Imports of Natural Honey..... 13

Figure 6: Revealed Comparative Advantage: Honey..... 15

Figure 7: Honey Care's Tripartite Business Model..... 18

ACRONYMS

CBI	Centre for the Promotion of Imports
CCD	Colony Collapse Disorder
CIAFS	Capacity to Improve Agriculture and Food Security Project
CSE	Centre for Science and Environment
EPOPA	Export Promotion of Organic Products from Africa
EU	European Union
FAOSTAT	Food and Agriculture Organization's Statistics Database
MSME	Micro-, small, or medium enterprise
NARS	National Agricultural Research System
NGO	Nongovernmental organization
PAH	Polycyclic aromatic hydrocarbon
SFP	Slow Food Presidium
SNV	Netherlands Development Organization
SPHC	Savannah Pure Honey Company
SWOT	Strengths, weaknesses, threats, opportunities
TIPCEE	Trade and Investment Program for a Competitive Export Economy
UK	United Kingdom
UNCTAD	United Nations Conference on Trade and Development
USAID	United States Agency for International Development

ACKNOWLEDGEMENTS

The following people contributed to the preparation of this report: Eliot Masters (researcher and author), Martin Webber, and Bill Noble. Editing support was provided by Deborah Dangay, Victoria Okoye and Leah Quin.

Special thanks to those organizations that provided information used in the preparation of this report.

I. INTRODUCTION AND BACKGROUND

I.1 HONEY AND BEESWAX VALUE CHAIN

This report focuses on the honey and beeswax value chain in the West Africa region, within the framework of the newly launched West Africa Trade Hub and African Partners Network. It summarizes the current structure, competitiveness, socio-economic importance, and dynamics of the honey and beeswax value chain in the region. The report briefly describes the key challenges and growth options facing the value chain and suggests strategic directions that will lead to sustainable growth and competitive upgrading of the value chain, enabling West Africa to emerge as a leading global supplier of honey and beeswax.

I.2 VALUE CHAIN ASSESSMENT

Following the submission of a Value Chain Selection Report, the Trade Hub is producing a set of Value Chain Assessment Reports. During May 2014, the project carried out assessments of each value chain that the selection report recommended for targeted support from the Trade Hub.¹ The assessments are the second step in planning activities for the project.

The Value Chain Selection Reports provide brief overviews of each value chain; the Assessment Reports offer deeper perspectives about the current status, structure, performance, and challenges of the value chain. They update previously available information where possible. Based on this information and analysis, they recommend a vision and upgrading strategy for each value chain, and outline possible support roles for the Trade Hub in helping value chain stakeholders achieve their strategy.

As the first opportunity for the Trade Hub team to resume interacting with industry stakeholders and to begin identifying lead firms and areas where the project can have a positive impact, the value chain selection and assessment process also provides an initial basis for dialogue, brainstorming, and planning with key sector and value chain stakeholders. This phase, nonetheless, provides only a brief glimpse of each value chain and serves as a vehicle to commence discussion and idea-sharing with partners. Given the limited time that was available for this process, the assessments do not constitute detailed value chain analyses.

I.3 ABOUT THE TRADE HUB AND AFRICAN PARTNERS NETWORK

USAID/West Africa's strategic goal is to support the emergence of a politically stable and economically prosperous West Africa. The Trade Hub's goals are to promote increased regional trade in key agricultural commodities (a goal of Feed the Future, or FTF) and to reduce poverty through value-added exports (a goal of the Africa Competitiveness and Trade Expansion Initiative, known as ACTE).

The overall objective of the Trade Hub and African Partners Network is to increase Africa's share of world trade by increasing exports at a faster rate than the rate of growth in overall trade, and by improving West Africa's international private sector competitiveness in targeted value chains other than extractive industries.

The project will achieve two intermediate results: 1) improve the private sector capacity of the region's farmers and firms by addressing constraints to targeted value chains; and 2) improve the business enabling environment by addressing economy-wide constraints such as the transport and trade barriers that affect the efficiency of the region's ports, corridors, and borders.

At its heart, USAID/West Africa's Trade Hub and African Partners Network is a capacity building effort that will entail working with several key groups of African partners. The project's focus will be on developing associations and regional alliances that can act independently from donor support and take on a greater leadership role in promoting reforms, attracting buyers and investors, and adopting improved practices. The project will also work with individual companies that have a regional scope and could serve as lead firms in targeted value chains.

The Trade Hub will achieve its objectives by improving the private sector competitiveness of certain value chains. Based on the initial assessments made in USAID/West Africa's Feed the Future Multi-Year Strategic Plan, five value chains were pre-selected for the project: rice, maize, millet/sorghum, livestock (cattle), and livestock (sheep and goats). They were selected based on the following criteria: importance to intra-regional trade, high potential for value addition, production by a large number of stakeholders, and synergies with other supported value chains.

The Trade Hub team also examined the development potential of a number of value-added value chains and selected several for possible inclusion in the project's portfolio. This selection was based on six high-level criteria:

1. Potential to increase trade
2. Potential to create jobs
3. Potential to attract investments (including from the U.S.)
4. Number of households participating
5. Extent of geographic dispersal in West Africa
6. Current level of exports to global markets

The assessment phase thus focuses on the following short list of value chains:

FTF Regional Value Chains:

- Maize
- Millet-Sorghum
- Rice
- Cattle
- Small ruminants

Value-added Global Value Chains:²

- Apparel
- Cashew
- Honey and beeswax
- Mango (and possibly other cut fruits/vegetables)
- Sesame
- Shea

² The home décor value and fashion chain was handled differently. Only a limited Trade Hub initiative is recommended for home décor and fashion. An assessment was not conducted for this value chain, since it is no longer considered a core Trade Hub focus.

West Africa is on the verge of a transformative change—if it can create a new dynamic for intra-regional and export trade. At present, intra-regional trade is inefficient, characterized by unpredictable distortions and uncompetitive practices, and subject to overly restrictive regulatory regimes. West African exports have limited success in the global marketplace due to poor quality, inconsistent supply, and high delivery prices, which can be traced back to the absence of economies of scale, high transaction costs, and a poor enabling environment.

The Trade Hub and African Partners Network aims to promote broader, more sustainable growth by improving both private sector capacity and the policies, rules, and practices that govern regional and external trade. This will achieve sustainable and measurable increases in regional and international exports, jobs, and investment by strengthening vertical and horizontal integration within value chains, assisting representative associations to become more effective and inclusive, and improving the enabling environment for trade. The project will also mount a cross-cutting effort to increase the professionalism of all major participants by providing role-specific competency training, facilitating access to modern technologies, and improving market linkages. The Trade Hub will:

- Leverage and strengthen already-identified or new private sector and public sector partnerships for commercial and development activities.
- Target the highest-impact opportunities in the value chains and policy regimes, to alleviate specific constraints hindering private sector growth. The cornerstone of our structured approach to value chain development is identifying, in collaboration with our for-profit value chain partners and our public and nongovernmental organization (NGO) partners, where high-impact change can be achieved to maximize the return on project resources. Our trade and transport enabling environment staff will target specific policy and regulatory constraints which, once changed, will open up regional and external markets, reduce seasonal blockages, lower supply chain friction, and encourage trade-based investment and growth. They will work closely with stakeholders to advocate and enforce reforms.

The Trade Hub’s higher-level results targets are summarized in Table I below.

Table I: Trade Hub Highest Outcome-Level Results

Results	Through Year 3	Through Year 5
Increase in the value of global and regional transactions, on average, in targeted sectors of livestock, grains, and value-added products in West Africa	30%	50%
Creation of new jobs in Trade Hub-assisted West African firms	15,000	23,000
Facilitation of new investment in targeted sectors	\$62.5m	\$102.5m

Because different partners have different needs and levels of maturity, the project will tailor upgrading activities to each partner. We have recommended and will select value chains that offer opportunities to substantially contribute to achieving these objectives. We will choose value chains that can benefit from Trade Hub-supported activities such as:

- Improved buyer-seller intermediation
- Expanded use of grades and standards
- Increased access to and use of market information
- Increased access to and use of financial services

- More competitive transport and logistics enabling environment
- Reduced legal and regulatory barriers to trade

2. METHODOLOGY

Value chain assessment is the second of three phases that will lead to agreement on the Trade Hub’s target value chains:

1. Phase I: Select (recommend) value-added value chains
2. Phase II: Assess selected value chains
3. Phase III: Vet and obtain feedback, leading to confirmed selection

Eleven separate Value Chain Assessment Reports, one for each value chain, present the results of the project’s assessments.

As part of the research for the assessment reports, subject matter experts collected and updated data and trend information relevant to each of the value chains. The value chain assessments use a common set of criteria to describe the short-listed value chains and update information about them. In contrast to the selection process, which used subjective measures of only certain criteria based on expert opinion, the assessment process utilized the full set of criteria, quantifying them as much as possible. Based on this analysis, the reports discuss strategic approaches that could be supported by the Trade Hub to achieve the value chain’s vision.

Existing value chain studies and their conclusions were strongly considered in the assessments; the Trade Hub team held meetings and phone/Internet discussions with knowledgeable stakeholders.³ The assessment team also began to analyze and discuss with stakeholders the opportunities and challenges facing each value chain and to make initial proposals for an upgrading strategy. If the stakeholders and the Trade Hub are able to identify a clear path for upgrading the value chain, it is more likely that the value chain will be ultimately included in the project’s portfolio.

2.1 VALUE CHAIN ASSESSMENT PROCESS AND SUBSEQUENT STEPS

Table 2: Steps in Value Chain Assessment and Final Selection

Task	Method
Assess short-listed value chains	Assess the five preselected value chains and the other short-listed value chains against a full set of criteria through desk studies, review of existing value chains studies, and key informant interviews with members of partner network
Obtain USAID/West Africa’s feedback on Value Chain Selection Report	Review Value Chain Selection Report; meet with Value Chain Development Specialist and value chain team
Submit Value Chain Assessment Reports	Assess all value chains, obtaining data and information through value chain studies, desk research, and key informant interviews; include discussion of potential value chain vision, upgrading strategy, and Trade Hub interventions

³ Given time constraints, we did not collect primary market data from the field or hold extensive interviews with a full roster of key informants.

Task	Method
Prepare facilitation guide for value chain stakeholder vetting	Based on the assessments, prepare summary presentation and process for vetting value chains
Vet value chain selection and assessment with stakeholders	Hold session within Project Partners Kick-off Workshop with Trade Hub stakeholders
Refine value chain selection and assessment, based on stakeholder feedback and suggestions	Continue interacting with key stakeholders and USAID as needed

The final selection will only take place after the official Project Launch event, which will take place on or shortly after July 15, 2014. Immediately following the Launch the Project will engage individual value chain partners to discuss and vet the Assessments and come to a common vision of the value chain and how the Project will work with them. The final action plans for each value chain will be set after the engagement meetings, and will take into account the stakeholder feedback.

2.2 SOURCES OF INFORMATION

The Trade Hub team obtained data and information for this value chain assessment through desk research from value chain analyses, studies, reports, and web-based material.

2.3 DATA LIMITATIONS

The database from the Food and Agriculture Organization’s Statistics Database (FAOSTAT) includes both honey and beeswax, but data for West Africa are conspicuously sparse. A range of reference literature was surveyed in preparation of this report, but no lead firms or experts could be identified within West Africa during the time of writing.

3. DESCRIPTION OF THE VALUE CHAIN

3.1 PRODUCTS INCLUDED IN THE VALUE CHAIN

The honey and bee products value chain of West Africa includes diverse products from the African honeybee *Apis mellifera scutellata*. These products range from poor-quality, smoky, and/or adulterated raw honeys gathered from wild hives (which are often destroyed in the process of collection), to managed hive production of high-quality, pressed mono-floral honeys of unique geographic designation. In addition to honey, related bee products of note include beeswax (with ready export and industrial value) and derived products such as propolis and royal jelly. Beeswax is generally classified according to color and by grades, ranging from those suited to pharmaceutical and cosmetic applications (used to coat pills and in skincare) to those for general use (Bogdanov 2009).

Table 3: European Union Definitions of Honey

By origin	Blossom honey	Obtained predominantly from the nectar of flowers
	Mono-floral	Single botanical source
	Poly-floral	Several botanical sources
	Honeydew honey	Obtained from the secretions of plants
By type of Processing	Comb honey	Honey still contained in the combs and presented and sold as such (comb and honey are edible)
	Chunk honey	Containing one or more pieces of comb honey
	Drained honey	Obtained by draining de-capped and broodless combs
	Extracted honey	Obtained by centrifuging de-capped and broodless combs
	Pressed honey	Obtained by pressing broodless combs with or without application of moderate heat

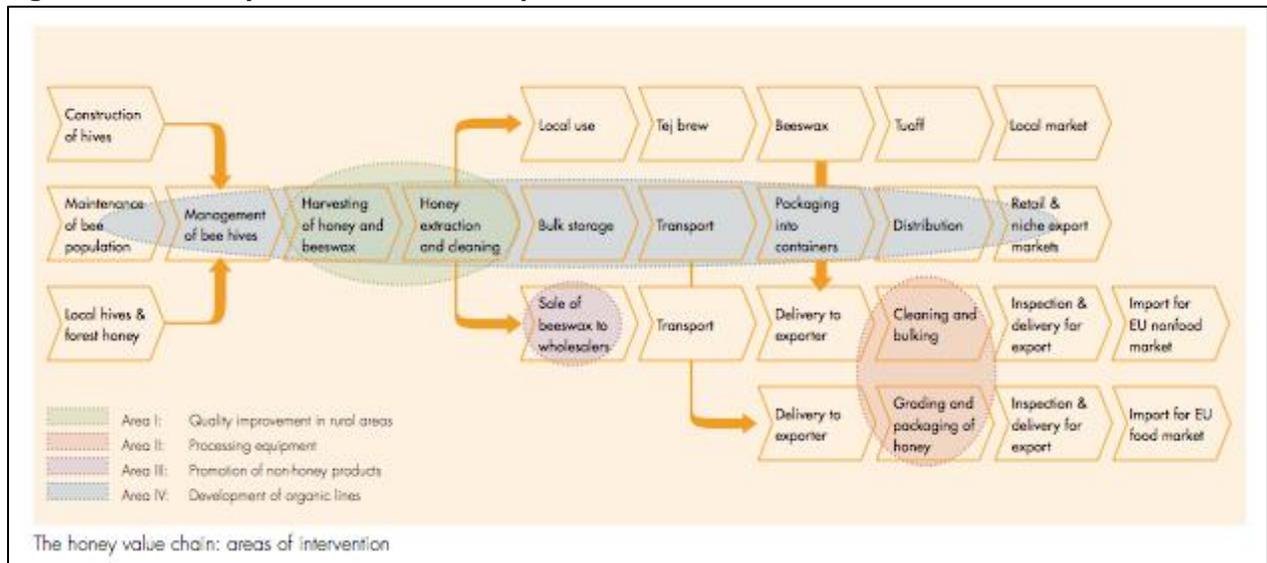
Source: McAdam 2007

3.2 VALUE CHAIN MAP

Generally speaking, West African honey is collected from the wild or from managed hives by smallholder farmers who practice bee-keeping or wild honey collection as an economic activity complementary to cultivation. Most of this honey is currently marketed in recycled containers (such as water bottles) on local markets, while only a small proportion is aggregated and processed into a clear, homogeneous product for marketing in new, labeled packaging in retail outlets.

The diagram in Figure 1 below shows an example of a well-developed honey value chain supported by the Netherlands Development Organization (SNV) in Ethiopia. In that country, high-quality honey (with beeswax as a by-product) is produced for export to the European Union (EU) with strict quality controls and other management systems. There is also some local use of honey for brewing the traditional mead known as *tej*.

Figure 1: The Honey Value Chain in Ethiopia

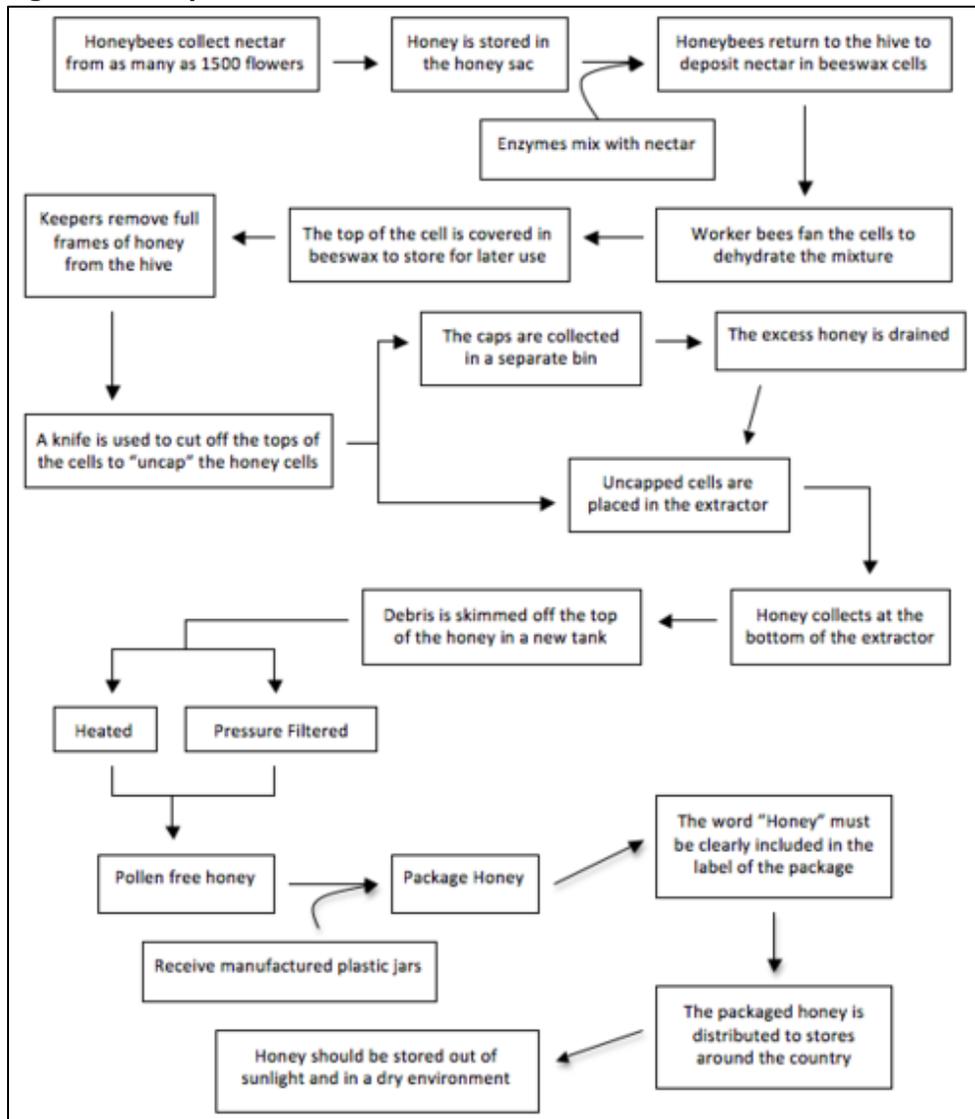


Source: Capacity.org 2010

3.3 PRODUCT FLOW MAP

The diagram in Figure 2 shows the various processing steps for collecting, processing (including heating and pressure filtration), packaging, and labeling honey for distribution and retail sale.

Figure 2: Honey Product Flow

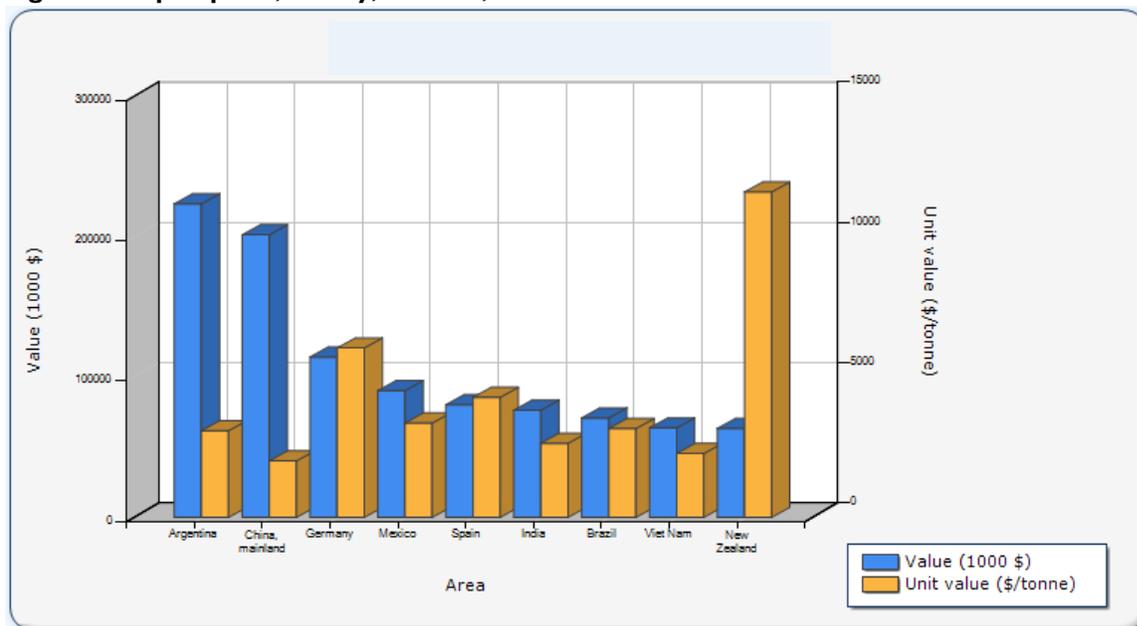


Source: I Love Charts n.d.

3.4 HONEY AND BEESWAX DATA AND INFORMATION

Between 2005 and 2010, global production of honey grew by over 10 percent, to 1.54 million metric tons. This growth took place despite concurrent declines in production in many regions due to colony collapse disorder (CCD) and the increasing virulence and spread of the varroa mite (*Varroa destructor* syn. *V. jacobsoni*) with which the CCD syndrome is associated. The U.S. has been most seriously affected (USAID CIAFS 2012). During this time, Argentina and China have remained the biggest exporters of honey, accounting for 28 and 26 percent respectively of all global exports in 2010. Recurrent quality problems, however, including traces of banned antibiotics and other toxic substances, have led to periodic bans on importation of Chinese honey into many markets, particularly the U.S. and Europe. African honey exports attained 12 percent of global supply in 2010, at 179,400 metric tons.

Figure 3: Top Exports, Honey, Natural, 2011



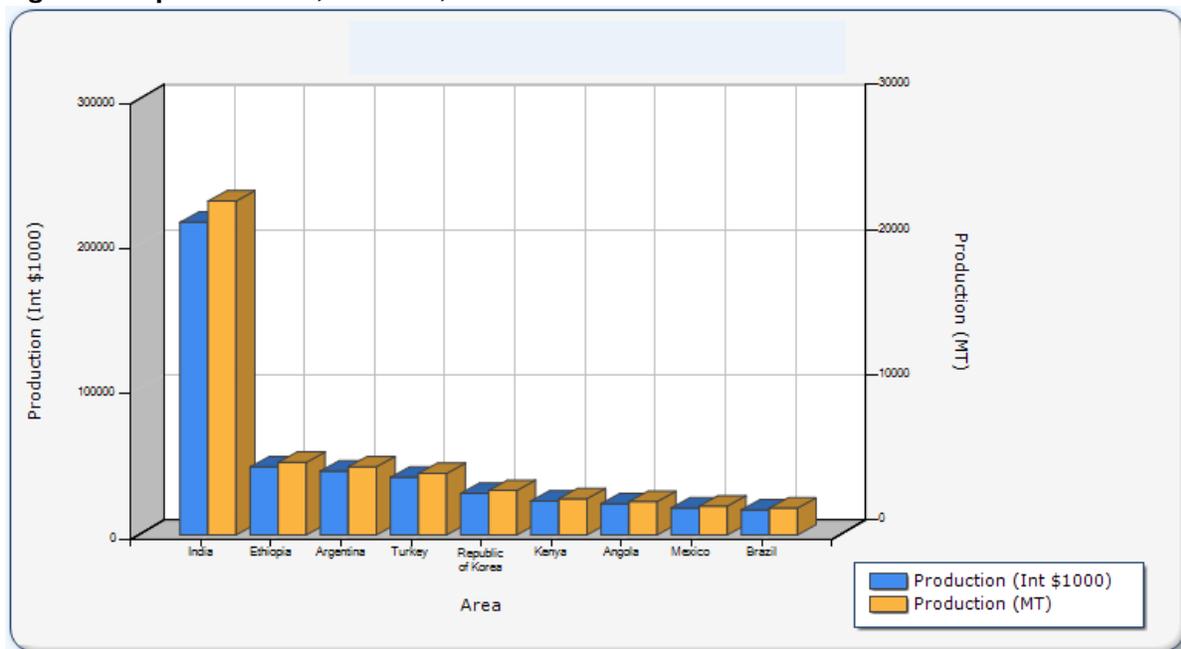
Source: FAOSTAT 2014

Honey is produced widely across Africa, in deep forest, savanna, lowlands, and highlands. Africa produces some distinctive specialty honeys found nowhere else in the world. In common with other honey-producing origins, many African countries are seeing huge growth in internal demand for honey, as middle classes become more aware of the health impacts of sugar consumption compared to the perceived health benefits of natural honey. The advantages of first serving local and national market opportunities include lower transaction costs (including marketing), less stringent quality criteria, acceptability of smaller volumes, and reduced transactional risks overall (UNCTAD 2006).

Unlike bees in many other global honey origins, the African honeybee *Apis mellifera* does not suffer from CCD and it displays resistance to (or tolerance of) the varroa mite that is a contributing factor in CCD (Camazine and Morse 1988). These and other global trends seem to ensure a promising future for African honey producers, that will enable them to meet growing market demand for African honey at the national, regional, and global levels (CBI 2009).

The world's biggest-producing country, China, has recently seen its reputation tainted in import markets—first by commercial conflict with the U.S. over dumping of cheap honey, then in the EU by serial contamination with the apiary antibiotic chloramphenicol, which can cause death if ingested by susceptible human individuals. Even worse was a series of “honey-laundering” scandals resulting from Chinese honey producers’ attempts to transship their products through third countries to conceal the origins of their honey so it could be illicitly imported into the EU and North America (CSE 2010).

Figure 4: Top Production, Beeswax, 2012



Source: FAOSTAT 2014

In markets where demand is strong, such as the U.S. and Europe, declining domestic production with which to meet growing internal demands, coupled with the impacts of climatic uncertainty and extreme weather events, has had drastic effects on productivity. Anthropogenic, biotic, and abiotic factors include declining forage habitats and the weakened state of many hives in those origins. In the U.S. market alone, honey production declined by 20 percent in the period prior to 2010. During previous years, domestic production in the U.S. met about half of total market demand. U.S. honey production was reduced to 150 million pounds for the third year in a row in 2013 — down from consistent production levels of 200 million pounds per year a decade earlier (Kamberg 2014). Other origins, including South America and India, have seen similar productivity declines in recent years. At the same time, global prices have been increasing, which may be seen as a growing trend that is likely to continue, given stable or increasing demand (Kamberg 2014).

3.5 MAIN ACTORS IN THE VALUE CHAIN

The main actors in the West African honey and beeswax value chain include smallholder farmers, market traders, packagers and retailers, and a very limited number of exporting firms. Non-governmental organizations (NGOs) and government regulatory bodies also impact the value chain.

3.5.1 DESCRIPTION OF THE VALUE CHAIN ACTORS

3.5.1.1 Lead Firms

Numerous suppliers of honey and beeswax from West Africa appear on the Internet (including those listed on the Chinese marketing site Ali Baba), but there are few major lead firm in the honey and beeswax value chain in West Africa. Neither does there appear to be any regional initiative or product-based trade association, as is the case in East and Southern Africa.

While sustainable production models have been successfully developed in East Africa by Honey Care Africa, developments have been slower in West Africa. Some important advances have been made in Ghana, primarily with the support of SNV and the Heifer Project International. Private sector entities, including the Savannah Pure Honey Company (SPHC) (based in Tamale in Ghana's northern region), have been engaged. In addition to processing honey for commercialization, SPHC is said to be involved in training producers and supplying beekeeping equipment (West Africa Insight 2012). In addition, Atlas Foods Ghana Limited initiated exports of Ghanaian honey to the EU from the Volta region, after considerable effort to receive accreditation. With this initial shipment, Ghana has joined Senegal, Uganda, Tanzania, Cameroon, Ethiopia, and Zambia as suppliers of honey to the lucrative EU market.

Beyond these first steps, there is one very notable example of a successful West African honey enterprise in Burkina Faso—*Miel du Gourma* in Fada N'Gourma. This is an initiative of the *Société Coopérative des Apiculteurs du Goulmou* in Selintaamba. In addition to very high-quality honey of mixed floral origins, the *Miel du Gourma* product line features a unique mono-floral honey made from the flowers of the shea butter tree (*Vitellaria paradoxa*), which is marketed as “shea honey” or *miel du karite*.

3.5.1.2 Micro-, Small, and Medium Enterprises

There are significant opportunities for product and enterprise development at the micro-, small, and medium enterprise (MSME) level within West Africa, both for honey and for beeswax. In particular, there are opportunities for increased production using best practices and simple (and relatively inexpensive) equipment for honey extraction, filtration, heat treatment, and hygienic packaging organized around collection centers.

3.5.2 RELATIONSHIPS BETWEEN KEY ACTORS

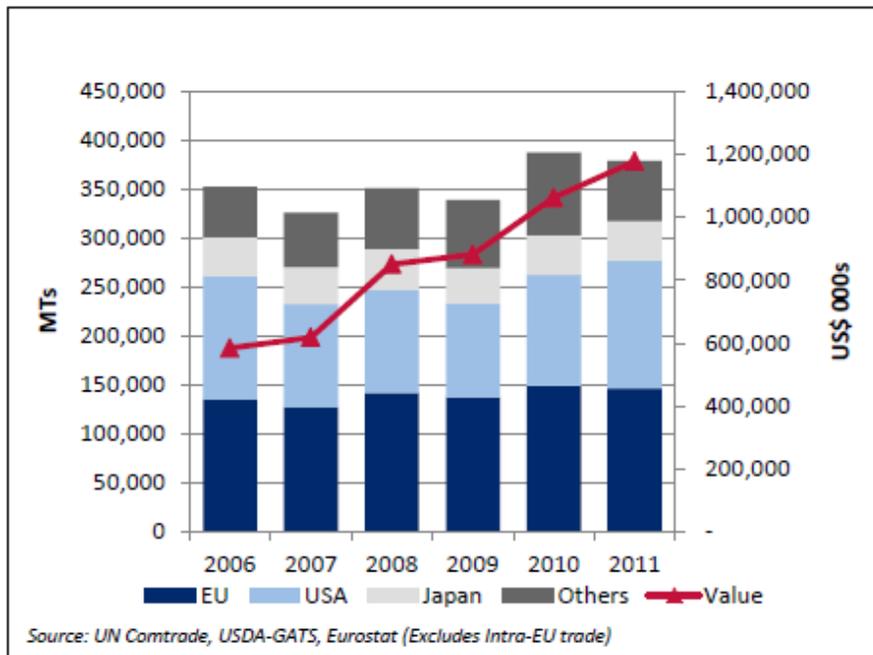
The honey and beeswax value chain of West Africa is very poorly integrated at present, with substantial opportunity for value-added intermediation and aggregation of production to increase value chain efficiencies and competitiveness.

3.5.3 OPPORTUNITIES AND ISSUES

The global demand for honey is valued at approximately \$1.4 billion per annum. EU countries comprise 20 to 25 percent of the consumption; China accounts for 15 percent; and the U.S. 10 percent (CBI 2009). The global market for beeswax is more limited, at \$65 million, of which the EU consumes about 30 percent, the U.S. 17 percent, and Japan 9 percent (FAOSTAT 2014). With the highest per-capita consumption of honey in the world, Europe has a supply that currently meets just 60 percent of its demand for honey. That demand grew by 8 percent from 2006 to 2011. In contrast, the sharp decline of U.S. honey production meant that only 35 percent of national demand could be met by domestic production in 2011, down from 42 percent just the year before (USAID CIAFS 2012). From 2006 to 2011, the value of U.S. honey imports grew by 124 percent, from \$172 million to over \$387 million. Figure 5 shows world imports of natural honey from 2006 to 2011.

Where global demand for honey and bee products is growing, its supply is in decline, with price implications that favor the entry of new suppliers onto the global marketplace. Africa is well-positioned to benefit from the emerging opportunities presented by this developing trend.

Figure 5: World Imports of Natural Honey



Source: USAID CIAFS 2012

Despite the need to address the most basic aspects of honey and beeswax production and marketing (e.g., producer training in best practices for product quality and sustainability, access to improved hives), there is clearly scope for product development of unique mono-floral honeys of West African origin, of which Burkina Faso's *Miel du Gourma* mono-floral shea honey provides a ready example. There are also very distinct opportunities for certified organic and fair trade honeys of West African origin.

4. DISCUSSION OF VALUE CHAIN ASSESSMENT CRITERIA

4.1 MARKET INFORMATION

Global trends indicate a favorable future for African honey exports. The challenge for African producers is to overcome issues of quality assurance at a larger scale through collective marketing and other measures (Bradbear 2009). Fortunately, there are some good examples of private sector initiatives in product development and marketing of African honey, including some that have targeted support from bilateral and multilateral donors through technical assistance from NGOs and the National Agricultural Research Services (NARS).

Global beeswax production is generally dominated by tropical and developing countries, as beeswax is commonly harvested along with honey using traditional production methods. Since most beeswax of North American, European, and Asian origin is contaminated with the acaricides needed to control the varroa mite, Africa has a distinct advantage—acaricides are neither necessary nor widely used to protect the relatively mite-resistant African honeybee (Bogdanov 2009).

Honey is produced across West Africa and in every ECOWAS country. Product quality is most notably advanced in Burkina Faso, Senegal, and Ghana, although all countries in the region have the potential to produce considerable volumes of high-quality honey and beeswax.

4.2 CONTRIBUTION TO ECONOMIC GROWTH

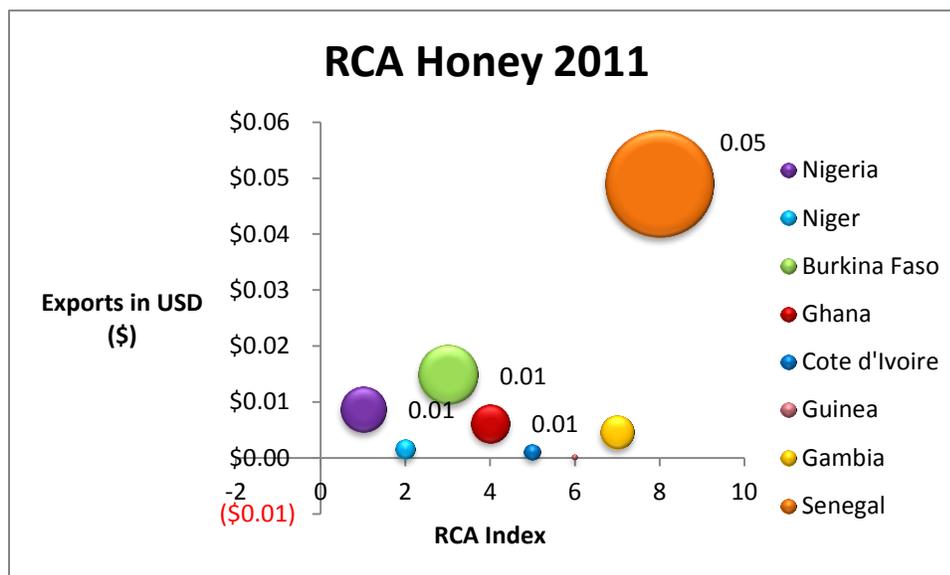
4.2.1 POTENTIAL TO INCREASE TRADE

Given declining global production of honey and beeswax, as well as the contamination and adulteration tainting the commercial reputation of honey from certain origins (e.g., China), importing firms are obliged to seek new sources among emerging countries of origin, particularly in Africa. Generally speaking, importers require clear honeys with minimal residue and no smoke odor. The products must not be adulterated with sweeteners or contaminated by pesticide or other residues. Beyond the product quality of any given shipment, importers seek consistency of product quality over time and reliable and timely delivery. The Trade Hub could do much to build confidence in West Africa as an emerging origin for global honey, particularly by facilitating and building the technical and market capacity of lead firms, and providing introductory linkages between them and global importers of honey and beeswax.

Niche markets for specialized honeys offer more distinctly high-value opportunities, particularly for honeys certified according to organic and fair trade criteria. Mono-floral and special varietal honeys not available in other markets are other alternatives. In addition to advantages conferred by its warmer climate, Africa maintains an additional advantage over European and North American honey producers with regard to organic honey, since it is not necessary for African producers to use pesticides to control varroa mite (McAdam 2007). Although some “generic” honeys of African origin are perceived as being dark and smoky due to traditional methods of smoking the hive, there are also examples of fine light honeys of specific provenance.

Included in Annex 2 is an analysis of “Revealed Comparative Advantage” for the honey sector in West Africa. This presentation is based on data as of 2011. The RCA index ranges from 0 to infinity with 1 as the break-even point. That is, a RCA value of less than 1 means that the product does not have export comparative advantage, while a value above 1 indicates that the product has a “revealed” comparative advantage. The table below provides a graphic presentation of the different countries within the region. For honey, none of the countries in the sample group show a revealed comparative advantage. The highest country on the RCA index for honey is Senegal (.05). This means that Senegal exports the most out of the West African sample chosen, but does not have a revealed comparative advantage in the region for honey exports. It would be beneficial to understand factors surrounding the export of honey in this region to understand the lack of RCA.

Figure 6: Revealed Comparative Advantage: Honey



4.2.2 POTENTIAL TO CREATE JOBS

Commercial development of the West African honey value chain should include improving management and product quality in order to increase volumes collected and expand volumes sold. Development would also need to increase value added at the smallholder and association levels, drawing from recent experience in East and Southern Africa. Trade Hub support to the honey and beeswax value chain in West Africa could lead to increased professionalization for West African beekeepers, resulting in some undertaking full-time employment managing their own beehives. Other jobs would be created in the aggregation and processing of honey and beeswax for bulk exports, as well as in packaging for distribution and retail sale.

4.2.3 POTENTIAL TO ATTRACT INVESTMENTS

Honey production and export have attracted significant investment in East Africa through the Honey Care Africa model in Kenya, where Root Capital and Kiva provide microfinance support, and in Ethiopia. Advances there over the past decade indicate that there is considerable scope for building up current honey exports from West Africa as well. Looking at initial exports from Senegal and Ghana to the EU, particularly to Germany (CBI 2009), we anticipate that these countries and their neighbors would benefit from an increased regional profile for West African honey. This would help them access export

markets and attract direct capital investment from companies in the EU, North America, and possibly Japan.

SNV has conducted a notable study of the honey value chain in Ghana (see Table 4 below), which includes a budgeted list of the equipment required to establish an enterprise with the capacity to process 300 mt of honey per year for a net return of over \$270,000 (SNV 2010).

Table 4: Details of Fixed Asset Investment Requirements for Honey Processing Firms in Ghana

Item	Quantity	Unit cost(US\$)	Amount (US\$)
Honey press	1	1,000	1,000
Solar Melter	2	100	200
Wax Processing tank	1	600	600
Sump Tank	1	600	600
Bulk Holding Tank	2	600	1,200
Filtering & Bottling Tank	2	800	1,600
Microscope	1	1,000	1,000
Scale	1	30	30
Trays	4	25	100
Refractometer	1	300	300
Hydrometer	1	250	250
Other Accessories		500	500
Contingency		500	500
Construction of centre	1	10,000	10,000
Total			17,880

Note: The maximum capacity of the processing facility is 500,000 kg of honey per annum

Source: SNV 2010

4.2.4 POTENTIAL TO GENERATE VALUE ADDITION

There is great potential for widespread value addition, both at the smallholder producer (household) level and at the small and medium enterprise level. Simple techniques and inexpensive technologies can support production of high-quality honeys, as well as beeswax as a valued by-product, that have export potential beyond the growing national demand within West Africa.

It should be noted, however, that demand is growing for honey among West African consumers as well, and that there is a growing market for well-packaged, well-presented high-quality honeys within West African countries of origin.

4.2.5 POTENTIAL TO GENERATE MARKET-BASED IMPROVEMENTS IN PRODUCTION YIELDS

There is significant potential to increase production of honey (as well as beeswax) in synergy with agricultural production. Since honeybees are key pollinators of cultivated crops, as well as wild botanical species, support to apiculture will have multiplier effects, increasing yields of many or most cultivated crops in West Africa.

4.3 IMPACT ON FOOD SECURITY

It is difficult to estimate the number of households engaged in honey collection from wild sources, as well as those managing kept hives. Sporadic estimates include 120,000 beekeepers in Nigeria and over 22,000 beekeepers in Ghana, of which about a third are female (West Africa Insight 2012).

As noted above, by pollinating cultivated crops and native vegetation, honeybees perform important agricultural and environmental services that enhance household food security and nutrition. Household consumption of honey can reduce the need to purchase sugar, and local sale of honey and beeswax can support purchase of an expanded and more diverse array of nutritious foods. SNV estimated that in Ghana honey provides an average of \$98 per year per beekeeper, thus providing an average of 23 percent of their total income (SNV 2010). Honey can provide up to 72 percent of household income for rural producers (West Africa Insight 2012).

4.4 SOCIAL IMPACT

Because apiculture is complementary to smallholder agriculture, production and marketing of honey is well-suited to generating social benefits by including women, youth, and other underserved populations.

4.5 COMPETITIVENESS

It is difficult to calculate revealed comparative advantage for honey and beeswax, since there are very few data available on exports of these products from West African countries. Over the past decade, FAOSTAT data show no honey exports and only sporadic exports of beeswax, amounting to a container or two from Guinea and Mali. Nevertheless, it seems clear that an upgraded honey value chain can respond reliably to market requirements with competitive quality and cost, and—given the declining productivity of other origins (North America, Europe, and Asia)—over time, West Africa can join East and Southern Africa as honey-producing origins of established reputation.

The primary advantages of West African honey have been discussed above. They include:

- Geographical and biophysical aspects that give Africa a basic advantage compared to competing origins in North America, Europe, and Asia, including a warmer climate and the African honeybee's resistance to varroa mites and CCD, which makes African honey clean of acaricide residues
- Broad distribution of microclimates favorable to apiculture across West Africa, where apiculture remains relatively underdeveloped
- Emerging consumer awareness of mono-floral honeys of West African origins with unique organoleptic properties, which would likely compete favorably alongside specialty honeys from Ethiopia (Worku) and Cameroon (Mt. Osu)

4.6 FACTORS THAT WOULD SUPPORT UPGRADING

Although the honey value chain in West Africa is relatively undeveloped compared to those in East and Southern Africa, there is evidently strong potential to leverage increased global exports of West African honey in a context of rapidly declining production and increasing prices in U.S. and global markets. With proper internal control systems for traceability and quality assurance, West African honey may be more competitive than Chinese honey due to food safety concerns.

Though apiculture remains generally under-developed across West Africa, there are notable and encouraging examples of product development and increasing professionalization of the honey and beeswax value chain. These examples might be readily leveraged with Trade Hub support.

4.6.1 CHAMPIONS FOR CHANGE

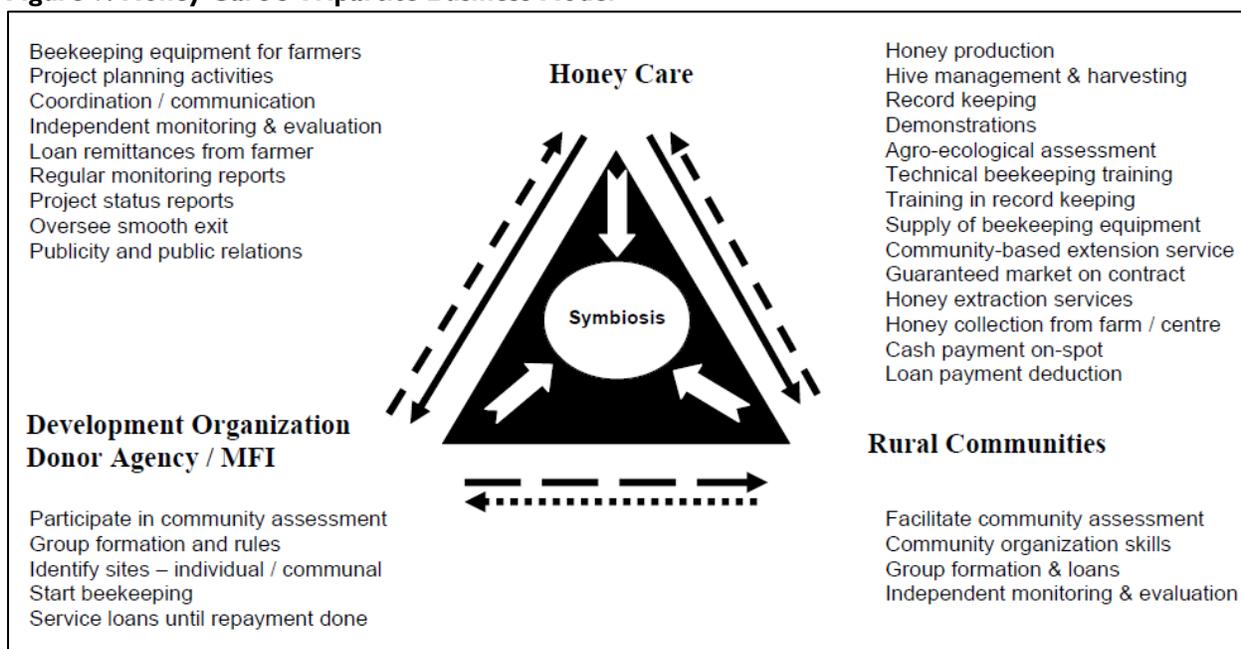
As mentioned elsewhere in this report, lead firms are conspicuously absent from the honey and beeswax value chain in West Africa, with few exceptions (such as *Miel du Gourma* in Burkina Faso and Atlas Foods Ghana Limited). SNV is seen as a champion for change, as it provides technical assistance for product development and marketing. To upgrade the honey and beeswax value chain in West Africa, the Trade Hub should establish a collaborative relationship early on with SNV. The project could convene a regional consultative meeting in West Africa with participation by a few U.S. and European importers, with the aim of promoting the engagement of more lead firms along the value chain.

4.6.2 ACCESS TO FINANCE

Interesting models of financial support for apiculture have been developed in East Africa, in particular by Honey Care Africa, and there is clear scope for diffusion in West Africa (Branzei and Valente 2008). While there is insufficient scope to present these models here, it is worth noting that the microfinance providers and other partners of Honey Care Africa (including Root Capital and Kiva) are present in several West African countries. They should be approached by the Trade Hub. Figure 7 below shows Honey Care's business model.

Financing will be necessary in order to upgrade the beekeeping equipment used by producers (improved hives, safety equipment, etc.); to establish aggregation centers for processing and packaging of honey and beeswax for distribution and marketing; and for export. Because it is unlikely that banks will be prepared to offer such financing, given the low collateral capacity of smallholder producers, it would be optimal if lead firms could be engaged to provide investment financing.

Figure 7: Honey Care's Tripartite Business Model



Source: Branzei and Valente 2008

4.6.3 PRODUCTIVE INFRASTRUCTURE

There is scope for investment in productive infrastructure for apiculture, including simple and inexpensive technologies such as the Langstroth, or “Kenya top-bar,” beehive; solar wax melters; centrifuges; filters; and other tools of the trade that increase productivity, make production more sustainable, improve producers’ safety, and enhance product quality.

4.6.4 SYNERGIES WITH EXISTING PROGRAMS

Development of West African apiculture to support the honey and beeswax value chain should be recognized as being fully compatible with, and complementary to, agricultural and horticultural production. Support for apicultural development should therefore be included in national and regional efforts to increase agricultural production and productivity, as well as in initiatives aimed at sustainable intensification of agriculture and horticulture.

4.6.5 POLICY ENVIRONMENT

To improve its competitiveness, the honey value chain must overcome regulatory and legal constraints. A favorable policy environment has been developing in Ghana and Senegal, in particular, to facilitate exports of honey from those countries to the EU. The exports must be in accordance with directive EU 2001/158/EC, which stipulates that in order to be included on the EU’s “third-country list” of authorized countries of origin for EU honey imports, national authorities in honey-exporting countries must submit a residue monitoring plan for monitoring pesticides, antibiotics, sulphonamides, and heavy metals. Most West African countries of origin do not have the accreditations needed for their producers to access the EU and other lucrative markets. In order to build regional capacity to export to EU markets, other West African countries must be persuaded to incorporate apiculture in their development plans and to provide the regulatory support needed for them to be included on the EU’s third-country list.

Other specific constraints to the policy environment include lack of accessible, practical, and commercially useful product quality grades and standards and a lack of enforcement of product quality assurance to support development of exports.

4.7 CLIMATE RESILIENCE AND ENVIRONMENTAL SUSTAINABILITY

Apiculture is a powerful resource for environmental sustainability. A key challenge is that climatic variation as a result of climate change may result in decreasing rainfall in some areas, leading to stress on hives and on wild bee populations. However, if sufficient water can be assured to maintain the hives, productive honeybees’ pollination function provides a unique and crucial environmental service by ensuring successful regeneration of woodland resources. The pollination also enhances yields of agricultural crops.

4.8 OTHER HURDLES TO SUCCESS

In general, the honey and beeswax value chains of West Africa suffer from lack of visibility, despite growing consumer demand for honey within Africa and growing global demand for unadulterated natural honey without the contaminants associated with Chinese-origin honeys.

4.9 SWOT ANALYSIS

The section summarizes the main strengths, weakness, opportunities, and threats (SWOT) related to the success of the honey and beeswax value chain.

Strengths

- African honey maintains a basic advantage compared to competing origins in North America, Europe, and Asia because of its warmer climate. The availability of water, rather than temperature, is the sole limiting factor in African apiculture.
- As distinct from other origins, African honeybee populations remain healthy and vigorous, distributed broadly across the agricultural landscape of West Africa, yet relatively underdeveloped as an apicultural resource.
- Africa maintains an additional advantage over European and North American honey producers with regards to organic honey, since it is not necessary for African producers to use pesticides to control the varroa mite, as is the case in other honey-producing countries (McAdam 2007). Use of neonicotinoid pesticides is not as advanced in West Africa as in those countries, and West African bee populations may be healthier and thus more stable as a result.

Weaknesses

- The honey value chain in West Africa is generally disorganized and ill-equipped. Producers' technical capabilities are relatively low compared with their counterparts in East and Southern Africa.
- Due to the nascent status of the value chain, relatively few countries have established export accreditation that would enable their producers to access the lucrative EU market and other global markets.
- Producers lack access to appropriate equipment and packaging materials.

Opportunities

- Although some generic honeys of African origin are perceived as being dark and smoky due to traditional methods of smoking the hive, there are examples of fine light honeys of specific provenance. There are other opportunities, as well, for product development and marketing of mono-floral and special varietal honeys found nowhere else.
- Niche marketing of specialized honeys offers more distinct high-value opportunities, particularly for honeys certified according to organic and fair trade criteria.
- In addition to honeys, and complementary to their production, African beeswax is seeing substantial and growing global demand.

Threats

- Although to date African honeybees have not displayed great sensitivity to CCD (which is linked both to varroa mites and the use of neonicotinoid pesticide), the agrochemical industry (Syngenta and Bayer in particular) has strenuously resisted recent findings of neonicotinoid culpability in CCD (Lu et al. 2014). It is very likely that there will be direct or indirect lobbying efforts to leave West Africa open to neonicotinoid promotion, particularly now that the EU market for such products has been closed.

- Given the nascent level of apicultural development in West Africa, it is very important that product quality and traceability by origin be respected by producers, consolidators, exporters, and national regulatory agencies. Contamination of a single shipment by pesticide residues and other impurities, or even by smoke (which imparts carcinogenic polycyclic aromatic hydrocarbons, or PAHs, specifically banned in Europe) could have disastrous consequences for any given country of origin. Re-use of plastic water bottles and other packaging (perhaps including petrochemical or agrochemical containers) also presents contamination risks.
- Climatic variation as a result of climate change may result in decreasing rainfall in some areas, leading to stress on hives and wild bee populations.

5. VISION AND UPGRADING STRATEGY

5.1 VISION

The Trade Hub's vision for upgrading the honey and beeswax value chain in West Africa is to promote increased visibility of the value chain in general, partly by integrating apiculture with support for cultivated crop value chains. The project can support the technical training and exchange needed for greater horizontal integration, and can develop investment plans to attract capital to the very promising and relatively inexpensive opportunities this value chain presents.

The Trade Hub strategy should support bulk production and aggregated trade of honey as a commodity, but also diversification of products and target markets. In particular, niche marketing of specialized honeys that offer more distinctly high-value opportunities, including West African honeys certified according to organic and fair trade criteria and mono-floral and special varietal honeys found nowhere else. At the same time, beeswax should be considered a high-value by-product of honey production for export, and not a waste material.

5.2 UPGRADING STRATEGY

Strategies for upgrading the honey and beeswax value chain will involve 1) raising the profile of the value chain, 2) bringing together diverse stakeholders to resolve the technical issues that constrain consistency of product quality, and 3) encouraging the establishment of private sector partnerships. Such partnerships should include increasingly formal and long-term sourcing arrangements and direct capital investment in processing enterprises for value addition within West African countries of origin.

The Trade Hub team recommends that the project's role in achieving these strategies be to serve as a catalyst by facilitating and bringing together lead firms, especially when affiliated with known brands and other Trade Hub partners (perhaps including the Burt's Bees division of the Clorox company, a member of the Global Shea Alliance). Key support would be provided by organizations with regional presence (such as SNV) and possible lead firms such as the *Miel du Gourma* operation in Burkina Faso and Atlas Foods Ghana Limited. With sufficient planning and preparation, a regional consultative meeting of value chain stakeholders could provide the basis for concerted action by the Trade Hub and our partners, resulting in a platform for technical exchange between producers and private sector intermediaries for both horizontal and vertical integration.

In the short term, Trade Hub support could address the technical training requirements of smallholder producers and associations in areas such as upgrades to product quality and consistency. Project assistance could include the development of multilingual and highly visual training materials, based on defined best production practices, similar to the "visual standards" developed under the USAID Trade and Investment Program for a Competitive Export Economy (TIPCEE) project in Ghana during the mid-2000s.

A medium-term objective will be confidence-building to promote establishment of formal contracting arrangements. Such arrangements could include microfinance and capital investment in processing enterprises for export.

5.3 RISKS AND MITIGATION

The honey and beeswax value chain in West Africa is seen as having very high potential for upgrading, while presenting few risks. Climatic variation as a result of climate change may result in decreasing rainfall in some areas, which may lead to stress on hives and wild bee populations, but this may only serve to redefine the production areas best suited to apiculture over time. There is a possibility that the African honeybee may become susceptible to CCD, particularly through increased use of neonicotinoid pesticides, but it is likely that West African governments will be following the issue now that the EU market for such products has been closed.

Probably the greatest risk to development of the honey and beeswax value chain is the risk of product contamination or adulteration. This could have disastrous consequences for any given country of origin. Re-use of plastic water bottles and other packaging (perhaps including petrochemical or agrochemical containers) also presents contamination risks. The Trade Hub and our partners should support initiatives to reinforce product quality assurance and traceability by origin, perhaps through producer groups and trade associations. The goal will be to ensure that these values are strictly respected by producers, consolidators, and exporters with constructive, rather than obstructive, support from national regulatory agencies.

6. ADDITIONAL INFORMATION NEEDED

To help upgrade the honey and beeswax value chain in West Africa, the Trade Hub (and our partners) will need to be guided by further consultation with West African exporters of honey and beeswax on the issues they face. We will also need to confer with U.S. and European firms that import honey and beeswax, to learn more about their requirements and their perceptions of West African bee products.

ANNEX I: BIBLIOGRAPHY

Bee Product Science. n.d. Online at: <http://www.bee-hexagon.net/files/fileE/Wax/WaxBookI.pdf>

Bogdanov, Stefan. 2009. "Chapter 1: Beeswax: Uses and Trade." *The Beeswax Book*.

Bradbear, Nicola. 2009. "Bees and their role in forest livelihoods: A guide to the services provided by bees and the sustainable harvesting, processing and marketing of their products." *Non-Wood Forest Products 19*. Food and Agriculture Organization (FAO) of the United Nations. Rome, Italy.

Branzei, Oana and Mike Valente. 2008. "Honey Care Africa: A Tripartite Model for Sustainable Beekeeping." Ivey Management Services, University of Western Ontario.

Camazine, S. and R. A. Morse. 1988. "The Africanized Honeybee." *American Scientist* 76: 465-471.

Capacity.org. 2010. "Value chain analysis." Online at: http://www.capacity.org/capacity/opencms/en/topics/context_systems-thinking/value-chain-analysis.html

CBI (Centre for the Promotion of Imports). 2009. "The Honey and Other Bee Products Market in the EU." *CBI Market Survey*. June 2009.

CSE (Centre for Science and Environment). 2010. "International honey trade: the murky side of sweet business." *Antibiotics in Honey Factsheet 4*.

FAOSTAT. 2014.

I Love Charts. n.d. "How Honey is Made." Online at: <http://ilovecharts.tumblr.com/post/5682083160/how-honey-is-made-had-to-research-and-create-this>

Kamberg, S. 2014. "Honey Update." S. Kamberg and Company Ltd. Food Brokers. May 2014. Online at: <http://skamberg.com/>

Konaté, Pape Tahirou. 2012. "La démarche de qualité liée à l'origine du miel de Casamance, Sénégal." FAO. Rome, Italy.

Lu, Chengshu, Kenneth M. Warchol, and Richard A. Callahan. 2014. "Sub-lethal exposure to neonicotinoids impaired honey bees winterization before proceeding to colony collapse disorder." *Bulletin of Insectology* 67(1): 125-130. Online at: <http://www.bulletinofinsectology.org/pdfarticles/vol67-2014-125-130lu.pdf>

Market Access Centre. n.d. Traidcraft Exchange. UK.

McAdam, Jackie. 2007. "EU Market Opportunities for African Honey and Beeswax." *Traidcraft*.

Niba, Julius and Verina Ingram. 2008. "Market access for Cameroon honey: challenges and opportunities for Cameroon honey to access European markets." Paper Presented at the 8th European IFSA Symposium, July 6-10, 2008, Clermont-Ferrand, France. SNV: Bamenda, Cameroon.

SFP (Slow Food Presidium). 2010. "Wukro White Honey, Ethiopia: A unique product and crucial resource in one of the most arid and inaccessible parts of the country." Slow Food Presidium: Valtorta, Italy.

SNV (Netherlands Development Organisation). 2010. "The Honey Industry in Ghana: An Overview." Synthesis Report.

UNCTAD (United Nations Conference on Trade and Development). 2006. "The African Honey Trade: Unlocking the Potential." Paper presented by Bees for Development (UK) at the UNCTAD Expert Meeting "Enabling small commodity producers in developing countries to reach global markets," organized by UNCTAD Commodities Branch. December 11-13, 2006.

USAID CIAFS (United States Agency for International Development Capacity to Improve Agriculture and Food Security project). 2012. "The World Market for Honey." Market Survey #01. Produced by Fintrac for USAID CIAFS. Addis Ababa, Ethiopia.

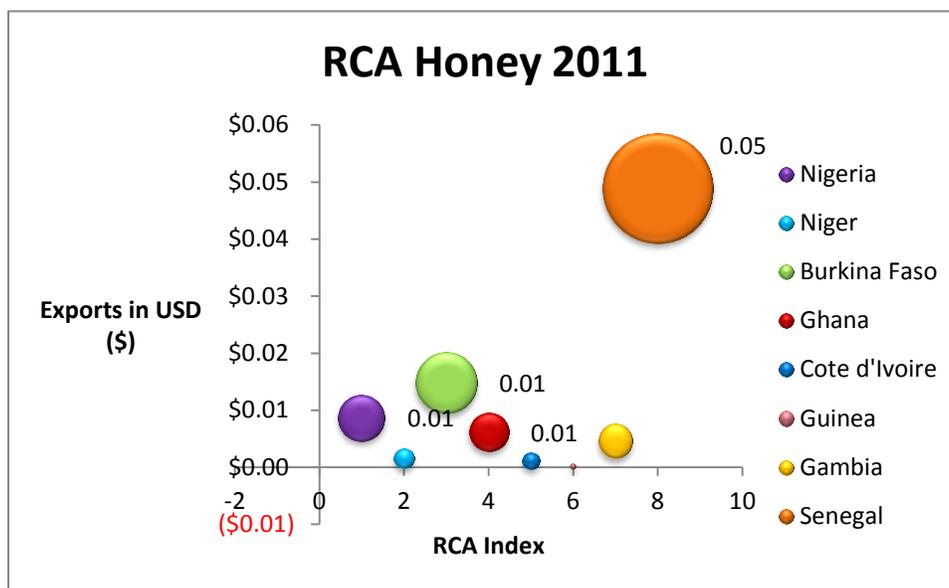
Van Loon, Marjo and Freek Jan Koekoek. 2006. "Export Opportunities for African Organic Honey and Beeswax: A survey of the markets in Germany, the United Kingdom, and the Netherlands." Export Promotion of Organic Products from Africa (EPOPA). Bennekom, the Netherlands.

West Africa Insight. 2012. "Honey better for income generation in Ghana."

ANNEX 2: REVEALED COMPARATIVE ADVANTAGE

The Revealed Comparative Advantage (RCA) for Honey and its supporting data is shown below:

Export data for 2011 except: Guinea (2006), Niger (2012), and Nigeria (2010)



Commodity export data from UN Comtrade, country totals from WTO.org, and world exports from FAO STAT 2011

	A	B	C	D	G	H	K	N	O	P
1	Products	Nigeria	Niger	Burkina Faso	Ghana	Cote d'Ivoire	Guinea	Gambia	Senegal	World
2	Honey	\$176,750	\$157	\$1,046	\$13,542	\$1,941	\$14	\$56	\$19,120	1,652,691,000
3	Country Total Exports	220,998,000,000	1,098,000,000	768,000,000	23,731,000,000	19,500,000,000	1,256,000,000	\$133,000,000	\$4,251,000,000	
4	World Total Exports	17,999,547,615,000								
5										
6	RCA Honey	\$0.01	\$0.00	\$0.01	\$0.01	\$0.00	\$0.00	\$0.00	\$0.05	

Explanation of Revealed Comparative Advantage

The idea to determine a country's 'strong' sectors by analyzing the actual export flows was pioneered by Liesner (1958).

The procedure was refined and popularized by Bela Balassa (1965, 1989) it is popularly known as the Balassa Index. Alternatively, as the actual export flows 'reveal' the country's strong sectors it is also known as Revealed Comparative Advantage.

Balassa defined the export performance of a specific product/industry from a country – as measured by revealed comparative advantage index – as the relative share of the country’s export of the product in the world export of the same product, divided by the overall share of the country in world exports. More specifically, the revealed comparative advantage index of product j exported from country i (RCA_{ji}) can be expressed as follows:

$$RCA_{ji} = (X_{ji}/X_{jw}) / (X_i/X_w), \text{ where:}$$

X_{ji} = exports of product j from country i X_{jw} = world exports of the product j X_i = exports of country i X_w = world exports

The RCA index ranges from 0 to infinity with 1 as the break-even point. That is, a RCA value of less than 1 means that the product does not have export comparative advantage, while a value above 1 indicates that the product has a “revealed” comparative advantage.

For the case of honey:

Export data (X_{ji}) for each country are shown in the row 2 under their respective country names; so the formula can be written as X (honey, Nigeria); X (honey, Burkino Faso), etc.

X_{jw} or X (honey, World) is in the cell P2 = \$1.6 Bil (rounded)

X_i , exports of the countries, are shown in the row 3

X_w , world total exports, Cell B4 = \$18Trillion

For honey, none of the countries in the sample group show a revealed comparative advantage. The highest country on the RCA index for honey is Senegal, where $(O2/P2)/O3/B4) = .05$. This means that Senegal exports the most out of the West African sample chosen, but does not have a revealed comparative advantage in the region for honey exports. It would be beneficial to understand factors surrounding the export of honey in this region to understand the lack of RCA.

These calculations are limited to some degree by the availability of export data.