



## AGRICULTURE AND FOOD AUTHORITY

MIRAA, PYRETHRUM AND OTHER INDUSTRIAL CROPS DIRECTORATE

# REPORT ON MIRAA, PYRETHRUM AND BIXA 2021



## **1.0 INTRODUCTION**

Miraa, Pyrethrum and Other Industrial Crops Directorate (MPICD) is one of the Directorates created under the Agriculture and Food Authority (AFA). The mandate of the Directorate is to regulate, develop and promote Miraa, Pyrethrum and Other Industrial crops sub-sectors in Kenya. The Directorate draws its mandate from the Agriculture and Food Authority Act ([Act No. 13 of 2013](#)) and the Crops Act ([Act No. 16 of 2013](#)). The Directorate is in the process of developing the Crops (Pyrethrum) Regulations and the Crops (Bixa) to streamline operations in the sub-sector. The functions of the Directorate are also aligned to the Constitution of Kenya 2010 and Vision 2030. The Directorate regulates three crops namely miraa, pyrethrum and Bixa.

### **1.1. Pyrethrum Sub - sector**

Pyrethrum was introduced into Kenya by the white settlers in 1928 for purposes of repelling mosquitos. By 1933, Kenya was already producing commercial volumes. Kenya pyrethrum was of very high quality, therefore quickly replaced the Japanese pyrethrum on the world market by around 1941. In the period between 1960s to late 1990s, Kenya was the world's leading producer of natural pyrethrum, providing more than 70% of the global supply. During this period, the sub-sector supported more than 200,000 small-scale farmers, 3,000 workers directly employed by the Pyrethrum Board of Kenya and over 2 million people deriving their livelihood from the industry either directly or indirectly.

Kenya's pyrethrum flower production declined from a high of 18,000MT in 1992 to the current national average production of 500 MT. The current acreage is 3,000 acres compared to over 20,000 acres in 1992. The number of growers has also reduced from 40,000 to less than 10,000 over the same period. With the growing health awareness and linkage of inorganic insecticides to cancer, pyrethrum has a huge potential being a major source of organic insecticide. Pyrethrum plays a major role in contributing to Agenda 2063.

## **1.2. Miraa Sub - Sector**

Miraa, the local name for Khat (*Catha edulis*) is a plant that grows wild in countries bordering the Red Sea and along the east coast of Africa, Khat is native to the horn of Africa and the Arabian Peninsula. It is an evergreen shrub, which is cultivated as a bush or small tree. The plant is seedless and hardy, growing in a variety of climates and soils. Miraa can be grown in droughts where other crops have failed and also at high altitudes. The succulent young tender twigs, leaves and shoots of the tree are consumed raw.

Miraa (Khat) is grown on commercial basis in Ethiopia, Yemen, Kenya and Eritrea. In Kenya, the crop grows naturally in many parts of the country and is cultivated in large quantities in Meru, Tharaka Nithi and Embu Counties. In Meru County, Miraa has been grown since the early 19th century with most plantations concentrated in the Nyambene hills. In the Mbeere region of Embu County majority of farmers have embraced Miraa production as a diversification strategy to boost their income as well as mitigate the production risks inherent in food crop production.

It is estimated that 20 million people in the world consume Miraa on a daily basis. The most common mode of consumption is chewing but it is occasionally taken as a 'tea'. The succulent young tender leaves and shoots of the tree are consumed for both functional and recreational purposes. Miraa consumption causes mild euphoria and handas (a common Kenyan word for Miraa effect), which helps the user remain alert at work, or to be loquacious in social settings

In Kenya, Miraa producers have traditionally targeted domestic markets in major towns and export markets. Europe was the second largest market for Miraa after Somalia prior to the ban in Netherlands in 2012 and United Kingdom in 2014. The major export markets before the ban were; United States of America, Canada, the United Kingdom, Germany, the Netherlands, Switzerland, Norway, Sweden and Denmark. The decision by Britain to ban the export of the plant in 2014 led to the loss of incomes in the growing regions considering that Kenya fetched an estimated £12.7 million from the sale of Miraa to the UK alone in 2010.

The market has, however, been shrinking due to a combination of factors including the perception of Miraa as a drug of abuse, association of the commodity with the international control of cathine and cathinone under the UN Convention on Psychotropic Substances (1971) and other adverse legislations.

Somalia is the largest export market which consumed upto 90% of the exported products. Potential markets however exist in countries which have not banned the use of Miraa which include; Democratic Republic of Congo (DRC), Yemen, Israel, Djibouti, Ethiopia, Mozambique among others. There is also need for the government in collaboration with traders to lobby the countries that have banned the use of Miraa to relook at their decision through bilateral engagements and support from the indigenous research community based on evidence based scientific findings on Miraa.

While the export market is shrinking, the domestic market is also threatened by unfavorable business environment including multiple levies by counties imposed at source, transit and destination markets.

### **1.3. Bixa Sub - sector**

Bixa is locally known as "mrangi", due to its bright red fruits that have numerous seeds. During processing, bixa colouring matter which is known as "bixin" is converted into a water soluble product called "norbixin". Bixa orellana is a shrub native to a region between northern South America and Mexico. Bixa orellana is grown in many countries worldwide. *Bixa orellana* is a plant native to Brazil but grows in other regions of South and Central America (Peru, Mexico, Colombia, Ecuador), Indonesia, Philippines India, Kenya, and East Africa

The tree is best known as the source of annatto, a natural orange-red condiment obtained from the waxy covering its seeds, 80% which consists of bixin (the red pigment) and norbixin or orelline (the yellow pigment)

The ground seeds are widely used in traditional dishes in Central and South America, Mexico, and the Caribbean, Annatto and its extracts are also used as an industrial food coloring to add yellow or orange color to many products such as butter, cheese, margarine, ice creams, meats, and condiments. North, Central, and South American natives originally used the seeds to make red body paint and lipstick, as well as a spice.

The annatto pigment has global economic significance as it is one of the most widely used natural dyes to color food, cosmetics and pharmaceutical products. It is used commonly in foods because the coloring does not alter the flavor and is not toxic. It is mainly used to dye ice cream, meats,

dairy products (cheeses, butter and margarine) and condiments. Cosmetic products include lipstick, hair coloring products, nail polish, soaps, lacquers and paints.

The main commercial producers of *B. orellana* are countries in Latin America (specifically Peru, Brazil and Mexico) which constitute 60% of total world production followed by Africa (27% of total world production) and Asia (12% of total world production).

The main market for annatto is the United States, western Europe and Japan. Trade in annatto extracts (instead of dried seeds) has increased strongly since the 1980s, with the water soluble norbixin extract being largest in volume, followed by vegetable oil extracts, and solvent-extracted bixin in third place.

The global market has witnessed a rise in the demand for natural food ingredients and colorants, which can be attributed to the increasing consumer demand for naturally-derived and safer food ingredients. Color additives reinforce the colors already present in the food and ensure uniformity of the food from season to season and batch to batch.

*Bixa orellana* grows easily in subtropical to tropical climates, in frost-free regions sheltered from cool winds. It prefers year-round moisture, good drainage, and moderately fertile soil in full sun or partial shade. It can be propagated from seed and cuttings.

In Kenya, *Bixa orellana* has been a cash crop grown by smallholders in the Kenyan Coast counties of Kwale, Lamu and Kilifi since the 1970s due to favourable climatic conditions with altitude ranging from sea level to 1200m. Kenya produces on average between 1,500 to 2,000 tons bixa seed annually.

## **2.0 MANDATE AND SERVICES OFFERED BY THE DIRECTORATE**

### **Mandate of the Directorate**

The Directorate is mandated to develop, promote and regulate Miraa, Pyrethrum and Bixa

## **Functions/Services**

- i. Promote best practices in production, collection, packaging, transportation, and storage of Miraa, Pyrethrum and Other Industrial Crops value chains;
- ii. Conduct capacity needs assessment in the Miraa, Pyrethrum and Other Industrial Crops value chain growing counties;
- iii. Develop the capacity of County Government Extension staff and other stakeholders on various technical aspects on Miraa, Pyrethrum and Other Industrial Crops value chains;
- iv. Develop and review technical materials (Handbooks, booklets, pictorials, charts, and brochures, etc.) for miraa, pyrethrum and other industrial crops;
- v. Collect, collate data and maintain the database on Miraa, Pyrethrum and Other Industrial Crops products;
- vi. Establish linkages with various governments and private research institutions to determine research priorities in Miraa, Pyrethrum and Other Industrial Crops and to advise generally on research thereof; and
- vii. Develop and maintain database and provide market information to traders of Miraa, Pyrethrum and Other Industrial Crops;
- viii. Research on market trends and opportunities in order to develop marketing strategies for the Miraa, Pyrethrum and Other Industrial Crops commodities;
- ix. Capacity build Stakeholders (Formulators, Processors, Traders and other stakeholders) on value addition and product development in collaboration with research and higher learning institutions;
- x. Provide trade promotional services by creating linkages between manuf Develop a facilitative policy and regulatory framework for Miraa, Pyrethrum and other Industrial Crops sub-sector;
- xi. Registration and licensing of value chain actors;
- xii. Surveillance along border ports and other Miraa and Pyrethrum growing areas;
- xiii. Inspection of nursery operators, dealers, processors, Importers, exporters and other stakeholders;

- xiv. Capacity build County Government staff and other stakeholders on Miraa, Pyrethrum and other Industrial Crops on requirements for registration, licensing, standards and the industry code of practice;
- xv. Keep records of contracted growers; and
- xvi. Recommend general industry agreements between farmers and buyers of Miraa, Pyrethrum and other Industrial Crops.

### **3. STRATEGIC OBJECTIVES**

In line with the AFA strategic plan the Directorate's objectives are: -

- i. Boost agricultural growth and productivity;
- ii. Upgrade Kenya's agricultural value chains for job and income creation;
- iii. Enhance market access and integration into global value chains;
- iv. Establish and enforce agriculture sector regulations; and
- v. Strengthen AFA's institutional framework to effectively and efficiently deliver on its mandate

### **4. REGULATIONS, COMPLIANCE AND LEGISLATIVE FRAMEWORK/REFORMS IN THE SECTOR**

#### **4.1. Pyrethrum Sub Sector**

Pyrethrum subsector was liberalized in the year 2014. This allowed admission of other industry players in the sector. Processors, formulators and commercial nursery operators were registered and licensed. Despite that, there still exist double legislations that provides for regulation of the pyrethrum sub sector ensuing from the existence of the Crops Act No. 16 (2013) and Pyrethrum Act No. 22(2013). The two Acts create legal confusion in regulating the sub sector since they have contradicting provisions. AFA was established to operationalize the Crops Act and not Pyrethrum Act (2013). Confounding the situation, there are stakeholders who hold allegiance to the Pyrethrum Act (2013) yet the Pyrethrum Regulatory Authority (PRA) established under this Act is non-existent as it was named as a former institution under the 2016 amendments to the AFA Act 2013. The Directorate is working towards repealing the PRA Act 2013.

## **4.2. Bixa Sub Sector**

Bixa was scheduled as a crop in March 2020. In the FY 2021/2022, the Authority initiated development of Bixa Regulations by holding consultative meetings to collect regulatory gaps and thereafter developed a draft of Bixa Regulations. The draft regulations were presented to different drafting committees including Sector Working Group for Agriculture (SWAG) and Joint Agriculture Sector Committee (JASCOM). Regulatory Impact Assessment is scheduled to be done within the year 2022.

## **4.3. Miraa Sub Sector**

The crops (miraa) regulations that have been undergoing development since 2016 when the crop became a scheduled crop subject to Statute Law Miscellaneous Amendments (2016) were finally published on 9<sup>th</sup> June, 2022. The development process involved extensive stakeholders' consultations in the country including involvement of the County Governments in the growing and consuming regions. This process further included wide public participations with government agencies with interest and influence in the value chains.

The regulations have the following objectives;

- i. Facilitate the growth and development of the miraa industry;
- ii. Enhance productivity and income of miraa farmers and other value chain actors;
- iii. Organize and coordinate partners and stakeholders in the miraa industry;
- iv. Attract investment opportunities and improve the efficiency of agribusiness services in the miraa industry;
- v. Facilitate the export of miraa and miraa products to augment the foreign exchange earnings of the country;
- vi. Safeguard food safety and quality standards of miraa.

The regulations further stipulate various requirements for registration and licensing by the traders and other stakeholders across the value chain. Additionally, they stipulate the interaction between the national and county levels of government in view of the devolved function of agriculture under the constitution.

## 5. STATISTICAL DATA ON PRODUCTION

### 5.1. Pyrethrum Data

The crop can be grown commercially in 19 counties namely: Nakuru, Kiambu, Nyandarua, Nyeri, Laikipia, Meru, Embu, Baringo, Elgeyo Marakwet, West Pokot, TransNzoia, Bungoma (Mt. Elgon), Uasin Gishu, Nandi, Kericho, Bomet, Narok, Nyamira and Kisii.

#### i. Pyrethrum Production (MT) Trend For The Past 5 Year

Production of flower in the last four years have taken a steady but progressive growth as shown below.

**Table 1: Pyrethrum production (MT) for 2019 - 2021**

<b>County</b>	<b>2019 Production (Kgs)</b>	<b>2020 Production (Kgs)</b>	<b>2021 Production (Kgs)</b>
Kiambu	754.96	1190.74	701.2
Nyandarua	7,801.32	35,249.59	121,901
Nyeri	3,271.52	4341.19	1296
Meru	2,516.56	2,410.45	622
Baringo	3,271.52	683.69	1,750
Elgeiyo/Marakwet	1,955.98	894.98	1,078
Kericho	5,637.08	668.66	15,176
Laikipia	5,033.11	1385.27	10,123
Nakuru	147,319	194,538.77	261,320
Nandi	1,207.94	81.94	162
Narok	2,677.62	1,197.07	1,297
Trans Nzoia	603.97	17.92	14
Kisii	3,523.18	1,203.47	1,941

Uasin Gishu	2,013.24	5,256.06	4,217.7
West Pokot	110,728.52	20,001.	4,4980
Bungoma(Mt. Elgon)	352.32	9,750.36	0
Nyamira	704.64	891.08	1,382
Bomet	3,523.29	5,151.76	32,603
Total	314,626	284,910	500,564.3

*Source: AFA – Miraa, Pyrethrum and other Industrial Crops Directorate*

**Table 2: Pyrethrum Extract – Volume and Value (2019 and 2020)**

	Unit	2017	2018	2019	2020	2021
<b>Pyrethrum flowers (dry)</b>						
<b>Production (farm)</b>	Tonnes	147.6	187.9	314.6	284.9	501
<b>Price</b>	Kshs/kg	130	151.91	217.77	200	213
<b>Value</b>	Ksh Million	19.2	28.5	68.5	57	106.7
<b>Pyrethrum Extract</b>						
<b>Production(factory)</b>	Tonnes	3	3.8	7.4	5.7	11.5
<b>Price</b>	Kshs/Kg	24,990.95	24,980.19	24,999.26	23,151.35	25,000
<b>Value</b>	Ksh Million	73.8	94	185.3	131.9	287.5

*Source: AFA – Miraa, Pyrethrum and other Industrial Crops Directorate*

## 5.2. Bixa Data

In Kenya, *Bixa orellana* has been a cash crop grown by smallholders in the Kenyan Coast counties of Kwale, Lamu and Kilifi since the 1970s due to favorable climatic conditions with altitude ranging from sea level to 1200m. Kenya produces on average between 1,500 to 2,000 tons bixa seed annually.

**Table 3: Bixa Seed Production for period 2016- 2021**

<b>Bixa seed Production ( Tons) from 2016 to 2021</b>			
<b>Year</b>	<b>Lamu</b>	<b>Kwale</b>	<b>Total</b>
2016	411	719	1,378
2017	390	811	1,019
2018	414	1,112	1,712
2019	501	1216	1,890
2020	916	1,170	2,200
2021	809	970	1,884

*Source: AFA - Miraa Pyrethrum and Other Industrial Crops Directorate*

*Bixa orellana* is planted commercially for its pigment, extracted from the pericarp of the seeds first by grinding the seeds and then extracting the pigment through use of enzymes, solvents or oil (corn oil or soybean oil). Solvents include alkaline solutions like sodium hydroxide or potassium hydroxide, as well as organic solvents, including hexane, acetone, chloroform and ethanol. Extractions using organic solvent yield the annatto pigment.

The annatto pigment has global economic significance, as it is one of the most widely used natural dyes to color food, cosmetics and pharmaceutical products.

The following are the categories of processed products in Kenya:

- Nor Bixin 40% (Water based)
- Bixin (Oil based)
- Annatto Solution
- Annatto oil

**Table:4 Export Value of Processed Bixa Production – 2016- 2021**

<b>Export Data from 2017 - 2021</b>			
<b>Year</b>	<b>Destination</b>	<b>Quantity</b>	<b>Total (Ksh.)</b>
2017	South Africa	2,719	8,560,000
	Europe	17,100	61,650,000
	USA	5,129	17,611,000
	Brazil	3,517	10,781,000
2018	South Africa	1,801	5,495,000
	Europe	43,653	154,468,000
	USA	11,014	32,600,000
	Japan	712	1,912,000
	Israel	108	384,000
	Brazil	7,984	25,212,000
2019	South Africa	2,417	8,762,000
	Europe	35,413	126,300,000
	USA	25,612	86,497,000
	Japan	754	2,209,000
2020	South Africa	2,918	10,111,000
	Europe	22,723	74,612,000
	USA	26,409	95,517,000
	Japan	1,784	5,609,000
	Israel	168	576,000
2021	South Africa	1,451	5,148,000
	Europe	36,734	126,000,000
	USA	29,611	86,494,000
	Japan	365	1,317,000
	Israel	293	976,000

*Source: AFA – Miraa, Pyrethrum and other Industrial Crops Directorate*

### 5.3. Miraa Data

The crop is grown mainly three counties; Meru, Embu and Tharaka Nithi. This is because of their favorable ecological conditions.

**Table 5: Number of Miraa growers and acreage in each region**

<b>Region</b>	<b>Number Of Farmers</b>	<b>Acreage</b>	<b>Average Acreage Per Farmer</b>
Igembe North	27384	57646.269	2.222035578
Igembe Central	15957	34234.505	2.204695067
Igembe South	27287	199733.102	7.60395561
Tigania Central	10941	51588.386	9.578237282
Tigania East	6490	6620.5671	2.072813745
Tigania West	7476	4070.153	0.571009119
Buuri	3764	2150.305	0.613321449
Imenti North	4059	2932.694	1.523477403
Embu County	292	163.315	0.561219931
Thara Nithi	3418	1801.274	0.551185435
<b>Totals</b>	<b>107,068</b>	<b>360940.5701</b>	

Source: The Miraa Taskforce Report Implementation Technical Team

**Table 6: Number of Miraa trees**

<b>REGION</b>	<b>NO OF TREES</b>
Igembe North	13,082,085.36
Igembe Central	34,660,123.82
Igembe South	52,226,763
Tigania Central	10,838,559.86

Tigania East	2,960,598.52
Tigania West	2,376,406.7
Buuri	518,565
Imenti North	1,428,300
Embu County	363,270
Tharaka Nithi	326,091.19
<b>TOTALS</b>	<b>118,780,763.5</b>

Source: The Miraa Taskforce Report Implementation Technical Team

## 6. PARTNERSHIP AND COLLABORATION

The Directorate are highly involved in public private partnerships depending on areas of collaboration with various players. These include;

- i. Ministry of Agriculture, Livestock, Fisheries and Cooperatives
- ii. Ministry of Industry, Trade and Enterprises
- iii. Ministry of Foreign Affairs& International Trade
- iv. County governments
- v. Kenya Agricultural Livestock Research Organization
- vi. Kenya Bureau of Standards (KEBS)
- vii. Kenya Plant Health Inspectorate Services (KEPHIS)
- viii. Pest Control Products Board
- ix. Processors
- x. Universities

## 7. LIST OF STAKEHOLDERS

**Table 7: List of Stakeholders**

	<b>Value Chain Actor</b>	<b>Name</b>
1	Pyrethrum commercial nursery operators	i. Pypro Ltd.
		ii. Karose Enterprises
		iii. Teibo Enterprises
		iv. Oldland Enterprises Ltd.
		v. Kahuruko Pyrethrum Growers SHG
		vi. Babuye Investment
		vii. Ternary Business Solutions
		viii. Senju International Ltd.
		ix. Kijana Mkenya Enterprises
2	Processors	i. Pyrethrum Processing Company of Kenya
		ii. Kentegra Biotechnology Limited
		iii. Botanical Extract
		iv. Africhem Botanical
3	Formulators	i. Pyrethrum processing Company of Kenya Ltd
		ii. Kapi Limited
		iii. Osho Chemical Industries Ltd
		iv. Maj Chemie Limited
		v. Twiga Chemicals
		vi. Tropical Brands
		vii. Juanco SPS
4	Bixa Processors	i. Kenya Bixa Limited

*Source: AFA – Miraa, Pyrethrum and other Industrial Crops Directorate*

## **8. THE FUTURE OF THE MIRAA, PYRETHRUM AND BIXA SECTOR TRANSFORMATION**

- i. Boost production and productivity through collaboration with County Government on production, postharvest handling, processing and promotion of Miraa, Pyrethrum and Bixa.
- ii. Collaborate with relevant institutions to enhance access to quality inputs and leverage on Public Private Partnerships (PPP) to promote value addition and market diversification.
- iii. Enhance competitiveness of the target value chains for creation of employment, income generation and market access.
- iv. Promote development of crop specific policies, regulatory frameworks, standards and codes of practices to enhance competitiveness.