

sector and child labour is not used. Due to state subsidies, growing kenaf does not require much investment; hence, kenaf farmers are less likely to fall into debt. Kenaf cultivation helps to generate sufficient income for household expenses and children’s education in addition to income sourced from rice as a rotation crop.²⁶

CONCLUSION

The Malaysian government developed kenaf as an alternative crop to tobacco since 2005 through an industrial plan. Kenaf provides a good return with little investment in terms of money, time and labour. Nevertheless, farmers rely on government’s subsidies and the state monopoly NKTB for agricultural support and marketing.

Ecologically, kenaf cultivation does not involve as much chemicals as tobacco. Kenaf grows fast and in crop rotation with rice. However, kenaf also encounters similar risks as most monocrops.

Socially, kenaf cultivation has a positive impact on farmers’ communities. It is less harmful to farmers’ health, because the plant is not poisonous and the use of chemicals is limited. Children are not involved in cultivation and economic returns support their education.

Although the National Kenaf and Tobacco Board will further promote kenaf as a sound alternative to tobacco farming, long-term sustainability of the kenaf sector strongly depends on the government’s ability to gradually phase out subsidies and render the sector self-sufficient.

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KENAF IN MALAYSIA

THIS SERIES OF CASE STUDIES TAKES A CLOSER LOOK AT ALTERNATIVE LIVELIHOODS TO TOBACCO GROWING WITH AN EMPHASIS ON SUSTAINABILITY. THE AUTHORS DESCRIBE THE ECONOMIC, ECOLOGICAL, AND SOCIAL ASPECTS OF REPLACING TOBACCO WITH KENAF IN MALAYSIA.

In the 1960s, tobacco (Nicotiana tabacum L.) was recognized as a socio-economic crop in the provinces of Kelantan, Terengganu, Kedah and Perlis. In 1973, the Ministry of Primary Industries established the National Tobacco Board (NTB) to regulate and promote tobacco cultivation.¹ Between 1970 and 2000, land hectarage devoted to tobacco cultivation nearly tripled, but tobacco was not a key contributor to the Malaysian economy.²

In 2005, the Malaysian government started a restructuring plan to phase out the tobacco farming sector, in line with its commitments under the WHO Framework Convention on Tobacco Control (FCTC) Article 17, promoting economically viable alternative livelihoods to tobacco workers and growers. Since 2013, the government disengaged from supporting and promoting tobacco and now solely implements policies to regulate the tobacco industry.

Year	Tobacco Growers	Tobacco Curers	Area Harvested (ha)	Total Production (t)
2000	20.821	326	9.129	7.172
2001	18.906	347	8.863	9.000
2002	16.201	348	10.000	12.404
2003	14.579	302	13.000	13.526
2004	11.708	292	12.100	13.850
2005	8.412	283	13.000	11.400
2006	3.835	166	10.650	8.900
2007	3.140	-	7.726	6.453
2008	3.846	-	7.720	6.278
2009	2.987	-	8.207	2.473
2010*	2.125	-	2.855	3.143
2011	1.953	-	2.636	2.916
2012	1.515	-	2.526	1.972
2013	587	-	538	453

Tobacco sector before and after AFTA (Sources: National Kenaf and Tobacco Board; FAOSTAT)

* AFTA agreement coming into force

In addition, the advent of the ASEAN Free Trade Area (AFTA) agreement, fully implemented in 2010, meant that imported tobacco leaves from neighbouring countries such as Thailand, Indonesia, Vietnam and the Philippines would become much cheaper than locally produced leaves.³ With tobacco no longer a viable crop, the number of tobacco growers plunged as did the amount of harvest and the hectareage.⁴

Consequently, tobacco farmers were encouraged to switch to kenaf and adopt crop integration with food crops such as corn, pumpkin, watermelon, sweet potato, and vegetables. With its Tobacco Industry Restructuring Plan (RPSIT) the government aimed to break the poverty cycle and contribute to food security.

KENAF INTRODUCTION IN MALAYSIA

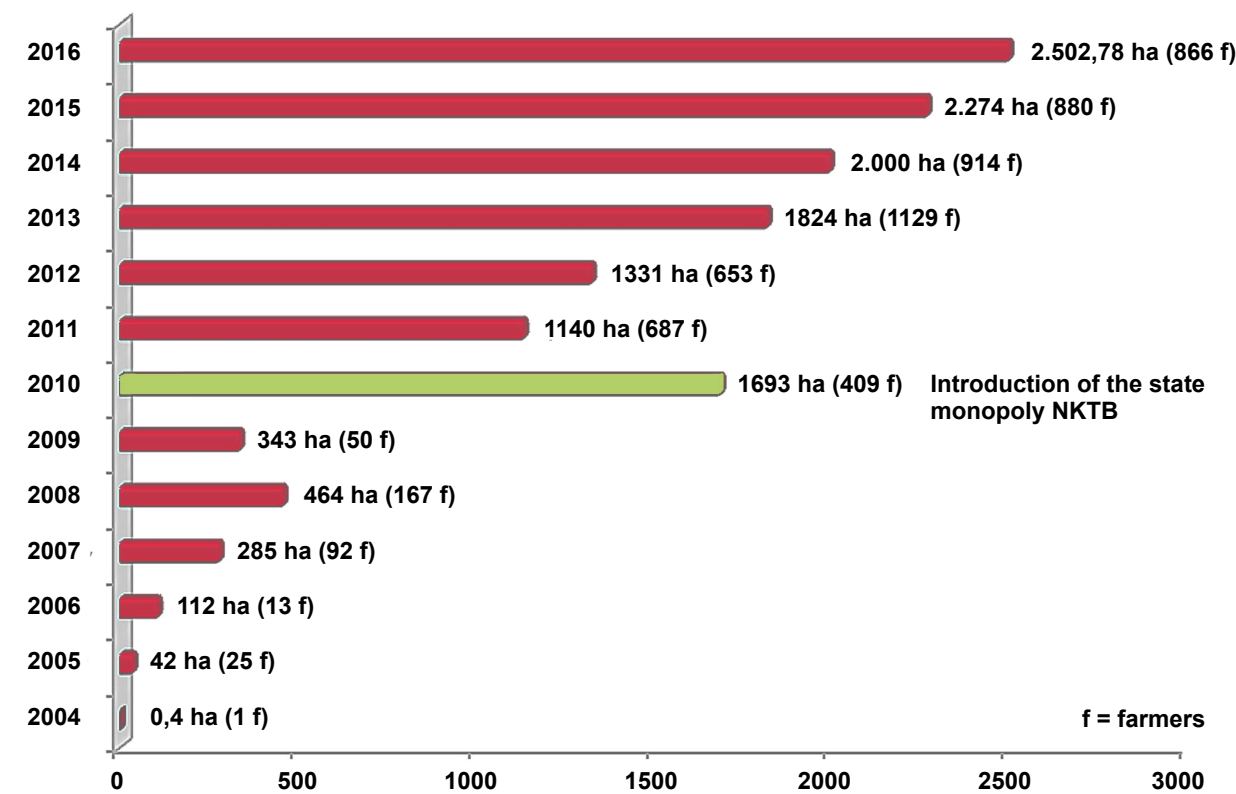
Grown for its fiber and seed oil, kenaf (*Hibiscus cannabinus* L.) is a versatile plant that easily adapts to a wide range of climate and soil types.⁵ Its fibers are used to produce e.g. high quality paper, biocomposites for car door trimmings and interior shelving, bioplastics, building materials like medium-density fibreboards, textile, furniture, and even high-protein animal feed. Vegetable oil from kenaf seeds has high omega antioxidant content, which is used in cosmetics, industrial lubricants, and biofuel.⁶

In 2000, kenaf was recognized in Malaysia as a new industrial crop supporting the diversification of the country's commodities sector. Therefore, kenaf research and development (R&D) was allocated MYR 5.8 million (USD 1.53 million) between 1996 and 2005 to attract investors for kenaf.⁷ It was identified as a potential candidate to replace tobacco after a failed attempt with roselle, another hibiscus species, in the 1990s.⁸

Kenaf was developed in four phases. Between 2004 and 2005, kenaf was first introduced to the National Tobacco Board staff. The next phase (2006-2010) involved kenaf crop introduction to growers, the development of a kenaf master plan and farming. Between 2011 and 2015, the focus shifted to the commercialization of kenaf crops and its core products. The current phase (2016-2020) targets on commercialization of new applications and branding of kenaf Malaysia's products.

From 2006 to 2015, the Ministry for Plantation Industries and Commodities allocated about MYR 100 million (USD 32.41 million) for R&D projects.⁹ Consequently, the National Tobacco Board was replaced by the National Kenaf and Tobacco Board (NKTB) in April 2010.¹⁰ The government aimed at making kenaf the third commodity plant after rubber and oil palm. The set targets were to reach 5,000 hectares of kenaf cultivation by 2015 and to increase production from 2,463 tonnes in 2010 to 150,000 tonnes by 2020. Thus kenaf should become a major contributor to the national economy.¹¹ Since 2010, kenaf was actively promoted as an alternative crop for tobacco and 880 farmers have taken it up, but expectations have not been met so far. Only 10 to 15% of these farmers have switched from tobacco. Most former tobacco growers are neither involved in tobacco nor kenaf farming as they have reached their retirement age and getting older. Some of them may have opted to plant food crops. In 2015, kenaf cultivation area has reached 2,274 hectares equalling 45% of its target while the production increased to 11,600 tonnes of dry stems.¹²

Each kenaf cropping season lasts about 75 to 120 days after planting.¹³ Since kenaf thrives well in hot climates with moderate rainfall, it is best cultivated in Malaysia from March to June with crop harvesting in July. Subsequently, the land is rehabilitated before rice is grown from October until January. Unfortunately, climate change prompted in recent years unexpected heavy rainfalls.¹⁴ As a result kenaf crops reportedly have been stunted or even destroyed due to waterlogged soil.



Cultivation of kenaf fibre and core between 2004 and 2016 (Source: National Kenaf and Tobacco Board)

ECONOMIC ASPECTS

Kenaf is heavily subsidized by the government via its state monopoly NKTB. The NKTB is mandated to assist tobacco farmers in shifting to alternative crops, especially kenaf, by providing technical support, financial incentives as well as seeds, fertilizers, pesticides, mechanization and training.¹⁵ Soil tilling and backhoe services are available to farmers without the need to own the machines.¹⁶ Generally, NKTB licenses all kenaf upstream and downstream activities such as planting, processing, manufacturing and selling.¹⁷ The NKTB also manages all activities related to the sale and purchase of kenaf from smallholders, thereby assuring them of a market at a price ranging from MYR 170 (USD 42) for wet stem to MYR 500 (USD 122) for dry stem per tonne as determined by the NKTB. Growing kenaf could therefore provide a good return of investment. Former tobacco growers acknowledge that kenaf is easy to grow and an excellent crop to replace tobacco when it is able to bring an income of between MYR 4,000 to 5,000 (USD 978 to 1,222) per hectare per season.

Kenaf plants grow quickly to a height of 3.5 to 4 meters and its maturity can be reached within four to six months. Harvested kenaf will be bundled up and delivered to an assigned NKTB Raw Material Collecting Center (RMCC) located nearest to the farm, with a relatively small transportation cost paid by the farmer.¹⁸

Collaborating with kenaf-based industries, NKTB established a ready local market, while some manufactured products are exported to countries such as China, South Korea, Japan, Thailand as well as to Europe. In 2015, Malaysia exported kenaf fibre valued MYR 830,000 (USD 193,000), while about 450 tonnes, equivalent to MYR 0.31 million (USD 72,000), were produced for the local market.¹⁹ The total sales value of kenaf increased from MYR 1.14 million (USD 265,000) in 2016 to MYR 1.68 million (USD 414,000) in 2017.²⁰ NKTB is willing to further promote the industry with an eye on the market in China.

ECOLOGICAL ASPECTS

In Malaysia, many R&D projects on kenaf have been directed towards product development and the improvement of the plant. However, knowledge about the environmental impact of the kenaf production chain is still limited. Favorable characteristics of the kenaf plant include the ability to absorb nitrogen and phosphorous present in the soil and also to accumulate carbon dioxide at a significantly high rate.²¹ Another study found that kenaf offers ecological advantages over fossil fuel sources by contributing to reduction of greenhouse gases and energy savings. Compared to other annual energy crops such as hemp or maize, kenaf requires less pesticides and fertilizers. Nevertheless, its cultivation has similar risks associated with soil quality, erosion, use of resources, and biodiversity as most monocrops.²²

Kenaf plants grow well on alluvium soil (sandy clayed type). However, tobacco formerly was often planted on BRIS soil, which is too sandy, weakly structured, and nutrient deficient.²³ It has low water retention capacity, limited ability to support plant growth, and a soil temperature that is relatively high for many types of agricultural uses.²⁴ Consequently, kenaf requires the application of more fertilizer and water on BRIS soil than on alluvium soil. Increased cultivation cost and slender kenaf yield on BRIS soil led some former tobacco growers to chose food crops such as watermelon, sweet potatoes, and corn which suited soil conditions better.

According to farmers, kenaf stumps and roots remaining after the harvest are left to biodegrade on-site, helping to restore the soil fertility for rice, the rotation crop.

At the NKTB Raw Material Collecting Center, the kenaf stalks are processed e.g. by water-retting to produce fibre and core. The kenaf stalks are soaked in water without adding chemicals to allow bacteria and micro-organisms to digest the cellular tissues and pectins around the bark's fiber strands (bast fibers).²⁵

The ecological impact of post-harvest processing of kenaf fibres into various finished products is difficult to assess because manufacturers don't disclose them referring to their proprietary rights.

SOCIAL ASPECTS

Farmers from Pasir Puteh, Kelantan, reported in interviews that kenaf cultivation is less labour intensive than growing tobacco. Kenaf plants grow with minimal care and are less prone to pest infestation and diseases, requiring moderate amounts of fertiliser and agrochemicals. Thus, poisoning risks are reduced, also because farmers are well equipped with protective gear. Farmers also reported that they developed rashes during harvesting kenaf after the plant had flowered. Preventive measures include protective clothing and harvesting before the plant flowers in the fifth month.

Kenaf farming sometimes involves family members, and for bigger plots, farm workers are hired during the harvesting season. More men than women are involved in the kenaf farming



Kenaf (*Hibiscus cannabinus* L.)