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## Development of sericulture in Uganda under commercialization of sericulture technologies and innovations

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### Abstract

Sericulture project was introduced in Uganda in 1971 as a joint venture between the government of Uganda through the ministry of Agriculture and Japan government through Japan International Cooperation Agency (JICA). It started as a research activity at Kawanda research Institute in Uganda where mulberry nursery was established to start an experiment of rearing silkworm using the eggs from Japan. The Commercialization of Sericulture Technologies and Innovations in Uganda started in 2018 which is implemented by Tropical Institute of Development Innovations (TRIDI) and funded by government of Uganda through the Ministry of Science, Technology and Innovations (MOSTI) with the aim of promoting the development of Silk Industry to create gainful employment and improved levels of income in sericulture through utilization of next generation sericulture technologies, innovations and management practices. Currently sericulture project in Uganda is implemented at thirty eight (38) National Sericulture Resources Research Stations country wide in twenty four (24) districts of Sheema, Mbarara, Kiruhura, Bulambuli, Kamuli, Mubende, Gomba, Mukono, Iganga, Luweero, Kayunga, Nakaseke, Nakasongola, Kween, Bukedea, Zombo, Nwoya, Buikwe, Pallisa, Busia, Lira, Amolatar, Otuke, Agago and Pader with total of over 2,300 acres of well-established mulberry gardens and has bought new additional 800 acres of land in Kayunga, Bulambuli, Kween and Nwoya. Employing a total number of 1,539 permanent and temporary workers, the project has installed its first set of Post Cocoon Processing Factories and is almost to be complete in Sheema and Kween district. On 16 December 2022, Uganda sent its first silk yarn brand samples, branded Usilk for testing on the European market and the target was to meet the specifications for Grade 6A which is the best quality silk globally as a basis for commercial production. Despite all the achievements made, sericulture project has suffered number of challenges namely lack of operational funds to pay delayed salaries/wages for workers, many workers have lost their jobs, some workers have their lost their lives due to lack of money to cater for their medical treatment, cannot pay school fees for children, do not have what to eat who were relying on sericulture project for their livelihoods and difficult to maintenance the mulberry gardens.

**Keywords:** Sericulture, development, employment, challenges

### Introduction

Sericulture is an agro-based industry that mainly focuses at rearing of silkworms with the main objective of silk production. Natural silk fiber is the main product of silk production obtained from domesticated silkworms (*Bombyx mori*) (Singh *et al.*, 2000) <sup>[10]</sup>. Sericulture was introduced in Uganda in 1971 as a joint venture between the government of Uganda through the ministry of Agriculture and Japan government under Japan International Cooperation Agency (JICA). It started as a research activity at Kawanda research Institute in Uganda where mulberry nursery was established to start an experiment of rearing silkworm using the eggs from Japan. The mulberry tree *Morus alba* L. originated from China 4700 years ago (Heuze *et al.*, 2019) <sup>[6]</sup>. The idea of sericulture industry in Uganda was pointed out by Mr. Gray, a senior officer at United Nation Development Programme (UNDP) in 1986. He led to the formation of Uganda Silk Producers Association (USPA). The rearing of silkworm and production of cocoon began in 1992 with two companies namely; Uganda Silk Industry limited (USIL) and Inuula Silk Estate limited (ISEL) eggs were imported from Japan, hatched and reared them in their own premises up to the third instar and the silk worms were distributed to the farmers to be reared until cocoon production.

The farmers sold their fresh cocoons directly to company which were dried up and exported to Japan.

To support sericulture development in Uganda, The Uganda Silk Sector Development Project (SSDP) was formed in 1993 which started operating from 1994 to 1999. European Union (EU) evaluated the (SSDP) and recommended it that the sericulture project is relevant in Uganda because of its good climate conditions which favour the growth mulberry and silkworm rearing throughout the year.

Most of the crops in Uganda are grown once or twice in a year but sericulture can be practiced 4-8 times in a year with high returns. The studies on income generation through agriculture crop and sericulture at farmer's level indicate that sericulture generates more income than other cash crops on the same piece of land annually (Trivedi & Sarkar, 2015)<sup>[9]</sup>. And thus provide regular employment to the farmers and workers enabling them to earn income compared to other crops which ultimately check the migration of population from rural areas to urban areas and hence, it is considered as an essential tool for the rural development for improving the standard of living of farmers (women and youth) at the village level. Due to high returns of sericulture, the government of Uganda owned sericulture project under the ministry of Agriculture, Animal Industry and Fisheries (MAAIF) and it collapsed because of mismanagement of funds by government officials. Regardless of the challenges faced by sericulture project in that year 1999, had trained over 400 silk farmers in mulberry growing and silkworm rearing in Uganda.

In 1999 the International Centre of Insect Physiology and Ecology (ICIPE), International Fund for Agricultural Development (IFAD), African Development Foundation (ADF) and government of Uganda led to another phase of the silk industry in Uganda. ICIPE funded the installation of 10 small multi-end silk reeling machines at Kawanda Agriculture Research Institute and trained several farmers in silk processing from reeling, re-reeling, weaving and garment design. Farmers organized themselves into groups and formed the Bushenyi Silk Farmers Association (BSFA) because most silk farmers were from western Uganda in 2002. On 26th June 2002, after the success of the reeling test at Kawanda (shown by samples sent to Japan, India and China), IFAD through ICIPE donated a full set of silk processing machines to BSFA. At the same time, the Ministry of Agriculture donated land to BSFA at Rubare Farm (now in Sheema district) to facilitate the construction of the silk factory donated by IFAD-ICIPE. The association was fully recognized by Bushenyi Local Government as a Community Based Organization in 2003. The silk factory was commissioned on 26/4/2003 by H.E the President of Uganda, Gen Yoweri Kaguta Museveni. Despite all these efforts by the IFAD-ICIPE and farmers there was no significant support from the Government of Uganda to support sericulture enterprise and it worsened by the death of Gershom Mugenyi an Entomologist from the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) in 2008 who was a key promoter of sericulture in Uganda.

The major challenges that had made the silk sector fail to take off in Uganda was lack of value addition and market for silk products, lack of silk worm eggs were farmers prepared for receiving silk worm for rearing but they became discouraged when no eggs were available for them, the farmers were scattered and the cost of gathering cocoons was very expensive, low volumes of produced cocoons,

poor quality which could not make up export capacity and lack of a well streamlined government funding towards the sericulture activity such as lack of operational funds for constructing new rearing houses for new farmers as well as payment of allowances for essential staff needed at the factory. There was also need for staff to travel and give support to farmers to practice good rearing techniques (field operation), deliver young silkworms and collect cocoons among other key activities.

In 2017/2018 financial year, the Government of Uganda funded a feasibility study which was done by Tropical Institute for Development and Innovations (TRIDI) under the title: 'Evaluating the utility of sericulture technologies, silk based textiles and other silk derived innovations as tools for household wealth creation and employment generation in Uganda. During this feasibility study project team evaluated different silkworm races, to determine the willingness of farmers to engage in sericulture on commercial basis and mulberry varieties for enhancing sericulture in different agro ecological zones of Sheema, Mbarara, Bukedea, Bulambuli, Iganga, Mukono, Mubende and Pallisa in Uganda. The feasibility results showed that the commercializing sericulture is one of the interventions that can improve the competitiveness of the sector, create jobs and improve the incomes and contribute to moving the population from subsistence to commercial farming. TRIDI started sericulture project in 2018 under the project entitled "Commercialization of Sericulture Technologies and Innovations in Uganda" with (1) one Sericulture Research Station at Rubare Sericulture Station in Sheema district and now the project is implemented in 32 National Sericulture Resources Research Stations in 24 districts. The main aim of project was to promote the development of sericulture Industry to create gainful employment and improved levels of income in sericulture through utilization of next generation sericulture technologies, innovations and management practices. This project also aims at increasing domestic production of Silk and it's by products, thus raising rural incomes for smallholder producers and ensuring the supply of affordable silk products to Ugandan consumers and export markets.

### **Current Status of Sericulture Project under Commercialization of Sericulture technologies and Innovations in Uganda**

Sericulture is an important labour intensive, agro-based industry providing gainful employment to unemployed/underemployed in the rural and semi-urban areas and facilitates economic development and improvement in the standard of life of the people in different countries across the world and Uganda inclusive. According to the International Sericultural Commission Statistics, 2020, Uganda was ranked 20<sup>th</sup> out of 22 silk producing countries with 3.10 metric tonnes of silk produced in the year 2019. Currently in Uganda, one of the leading research institution promoting sericulture production (Tropical Institute of Development Innovations) under the project entitled 'Commercialization of Sericulture Technologies and Innovations in Uganda' has so far implemented thirty eight (38) National Sericulture Resources Research Stations in twenty four (24) districts of Sheema, Kiruhura, Bulambuli, Kamuli, Mubende, Gomba, Mukono, Iganga, Luweero, Kayunga, Nakaseke, Nakasongola, Kween, Bukedea, Zombo, Nwoya, Buikwe, Pallisa, Busia, Lira, Amolatar,

Otuke, Agago and Pader with a total of over 2,300 acres of well-established and maintenance mulberry gardens. Commercialization of Sericulture Technologies and Innovations in Uganda annual project report 2021, Tropical Institute of Development Innovations

### **Employment Opportunists under Commercialization of Sericulture technologies and Innovations in Uganda**

Currently in Uganda, the Commercialization of Sericulture Technologies and Innovations in Uganda' is implemented at 38 National Sericulture Resources Research Stations country wide in over 24 districts, employing a total number of 1,539 workers, 139 technical full time staffs, 1300 casual workers, 100 constructors/builders and the project has also recruited 140 graduate trainees who are undergoing different trainings to be allocated different project sites to offer technical support in the silk value chain. All these employees are employed directly in sericulture field activities such as planting of mulberry gardens, management of mulberry gardens, harvesting of mulberry leaves to feed silkworms, silkworm rearing, reeling of silk cocoons, silk yarn making, silk fabric making, printing, dyeing as well as marketing silk products and construction of rearing houses and staff houses and all of workers earn a living in form of salaries and wages (Commercialization of Sericulture Technologies and Innovations in Uganda annual project report 2022, Tropical Institute of Development Innovations). Sericulture is regarded as best tools for solving the problem of unemployment and underemployment of many youth and women in rural areas. Sericulture is also seen as great potential in creating job opportunity to the poorer farmers and increasing their income of the smallholding farmers.

### **Achievements under Commercialization of Sericulture technologies and Innovations in Uganda**

The sericulture project under Commercialization of Sericulture Technologies and Innovations in Uganda has registered a number of achievements; the project has installed its first set of Post Cocoon Processing Factories and is almost to be complete in Sheema and Kween district. Developed specifications for establishing and operationalizing a complete line of next generation equipment for post cocoon technologies and innovations and completed and contract to manufacture, install and build capacity of Ugandans to operate the processing line finalized. On 16 December 2022, Uganda sent its first silk yarn brand samples, branded Usilk for testing on the European market and the target was to meet the specifications for Grade 6A which is the best quality silk globally as a basis for commercial production in Uganda. Uganda is currently producing raw silk which is divided into 11 grades; 6A, 5A, 4A, 3A, 2A, A, B, C, D, E and F. The sericulture project started with one sericulture research station at Rubare in Sheema district and now it has been spread to more than thirty eight (38) National Sericulture Resources Research Stations in twenty four (24) districts with a total of over 2,300 acres of well-established maintenance mulberry gardens. Development of physical infrastructure such as rearing houses were constructed in Mukono, Nwoya, Gomba, Mubende, Kween, Kitagata, Kiruhura, Busitema/Busia, Nakaseke and Luwero. Egg Production house was also completed in Sheema district and three (3) staff has been trained in egg production. The

project had completed construction of two shells for two research stations in Sheema and Mukono. In the year 2021/2022 sericulture project has also bought new additional 800 acres of land, 400 acres in Kayunga, 200 acres in Bulambuli, 100 acres in Kween, and Nwoya 177 acres land for expansion purposes to meet targeted acreage of 50,000 acres of land for sericulture project in Uganda. On-farm commercialization at Farmers Field is already ongoing on 92 farms. Their capacity continued to be enhanced through regular extension services. These farmers will act as Trainer of trainers. Additional 450 farmers who had been silk farmers were followed up and their needs identified. (Commercialization of Sericulture Technologies and Innovations in Uganda annual project report 2021, Tropical Institute of Development Innovations)

### **Challenges facing Commercialization of Sericulture technologies and Innovations in Uganda**

Despite all the achievements under commercialization of sericulture technologies and innovations in Uganda, sericulture project has suffered number of challenges which include the following;

- The main challenge is lack of well-established government policies on sericulture development in Uganda.
- Delayed salaries/wages payment for staffs and casual workers has also affected the operation sericulture activities, many staffs and casual workers have lost their jobs, cannot pay school fees for children, do not have what to eat and some have lost their lives due to lack of money to cater for their medical treatment who were relying on sericulture project for their livelihoods.
- Some sericulture farmers are now getting discouraged due to lack of funds to support them with training, demonstrations, supply mulberry planting materials and silkworm eggs were farmers had prepared to receive silk worm eggs for rearing.
- Unfavorable working conditions such as weather changes, scarcity of water which were at times unfavorable to the workers in some stations.
- There is a challenge of lack of working tools and equipment's faced by workers at the sericulture stations such as garden tools (pangas and hoes), protective garden wear (gumboots, overalls) and any other protective gears.
- There is lack of local and international markets available for the silk products produced by farmers in different part of the country

### **Conclusion**

Sericulture industry in Uganda is regarded as best tools for solving the problem of unemployment and underemployment of many youth and women in rural areas. Sericulture is also seen as great potential for providing the employment opportunities to more than 1,539 workers who work as technical staffs, causal workers and constructors/builders are employed directly in sericulture field activities and all of workers earn a living in form of salaries and wages. Sericulture can also provide employment to the women and youth trough the year thus controlling rural-urban migration and high crime rates resulting from unemployed youth in Uganda.

### Recommendation

- The government should set clear well-established policies and strategies that aim at promoting the sericulture activities in Uganda.
- The government should support the works to carry out studies and documenting sericulture practices so as to aid education, dissemination and sensitization of sericulture farmers and out growers and all stakeholders.
- The government should support the training of farmers and well equipped them with proper quality control measures skills during silkworm rearing and this can be possible through government support and funding.
- The government should support the infrastructure development like installing of silk processing factories and construction of rearing houses in different parts of the country as way of providing employment opportunities to unemployed people such youth and women in rural areas.
- The government should create local and international markets available for the silk products produced by farmers in different part of the country.
- The government should encourage farmers to embrace sericulture farming as a way of additional household income because most of the crops can be grown once or twice in a year but sericulture can be practiced 4-8 times in a year.
- The government should encourage and motivate the private investors to boost the sericulture industry in Uganda.

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