CHAPTER II
PROFILE OF THE STUDY AREA AND HISTORY AND GROWTH OF MATCH INDUSTRY

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2.1. INTRODUCTION:

This chapter deals with History and Growth of Match Industry. Though the match products have been in many places of the country, the contribution of Kovilpatti Taluk in this field is very remarkable. The match products of Kovilpatti Taluk meet the requirements of both domestic and foreign markets. The growth of match industries in and around Kovilpatti Taluk is faster than those of other places. The main reason behind this growth is the availability of required natural resources. They are suitable climatic condition, cheap labour force, raw material availability and above all the favourable attributes of entrepreneurs. In this chapter the researcher has reviewed the various aspects of Kovilpatti Taluk.
2.2 HISTORY AND GROWTH OF MATCH INDUSTRY AT KOVILPATTI TALUK:

The first Indian venture in match industry was as early as 1894, when Amrit Match Factory at Bilaspur and Gujarat Match Factory and Ahmadabad were established. The early Indian match production was dependent entirely on foreign machinery, imported technology and raw materials. Sweden, which was enjoying a world monopoly at that time, was meeting almost the entire demand for matches in the country. It established the Western India Match Company (WIMCO) in 1923 and within the next four years, four more units were added. At that time aided by Japanese efforts, manufacture of matches in the small scale and non-mechanized sector was also developing fast, at first in Bengal and then in South India, where it was confined to three centers in Tamil Nadu, namely Kovilpatti, Sattur and Sivakasi.

Western countries made researches in chemical composition in the year 1827 and the efforts to produce such of match proved successful. The first firm set-up solely to produce matches was M/s. R. Bell and Co., of London in 1932. In 1855 John Lendstorm of Jonkoping in Sweden devised the method of solving this problem and manufactured the first safety matches packed in containers namely match boxes. The new type of matches came to be known as safety matches, a term which is used in current time. Later in 1892, John Pusey, and American Attorney, developed “Book Matches”. These were first manufactured on commercial basis in 1896. Later in 1935, Travancy found out a mixture containing manganese di-oxide which can replace potassium chlorate.

Since John Lendstorm of Johnkoping belonged to Sweden. Sweden was universally acclaimed as the home of match industry. Sweden got the initiative in developing technique of pioneer to introduce automatic machinery for production of matches. Because of its pioneering effort in match production, Swedish firms and their agencies had a lion’s share in the supply of safety matches to the world market. At the same time Japan was also promoting match production in small scale, competing with Sweden. In India five large scale match industries were setup by WIMCO one each at
Amarnath near Mumbai in 1924m at Kolcutta in 1924m Dhubasi in Assam in 1926, at Chennai in 1929 and Barely in Uttar Pradesh in 1930.

Safety matches which are finding today have undergone many changes, technically and otherwise, since the people first learnt to produce fire by striking stones with each other. It will be interesting here to refer to the development of matches in the beginning and its growth later. The pocket lighter containing sulphuric acid or the dipping match was the earliest form of matches. The method adopted for the generation of fire in the pocket fire earner was very simple when the match had been coated with potassium chlorate were dipped into sulphuric acid, they got readily ignited. This type of match was invented in 1805.

The technology of match industry was first brought to India in the year 1910 by a few Calcutta settled Japanese families. However these families could not survive because of keen competition of Swedish Match Company which exported matches to India cheaply and enjoyed and international monopoly in the production and sale of matches. To protect the indigenous manufacturers from the competition of Swedish match a duty of Rs. 1.50/- per gross had been levied since 1922 on the matches imported into India. As a result of this Sweden established a unit in India in 1922 and a small match unit of indigenous production were also established. The Sweden match company established the Western India Match Company Limited (WIMCO) with a few branches at six centers in the country. In South India, Tamil Nadu plays an important role in producing matches. In Tamil Nadu, Kovilpatti Taluk is the birth place of match industry. Kovilpatti is an industrial city where large number of people relies on the various industries for their livelihood. Since Kovilpatti is a drought prone area, the agricultural operations are very limited level and it has a favourable climatic condition to establish match industry in Kovilpatti Taluk. Later many entrepreneurs entered in this field and started match units by adopting both partly mechanized and non-mechanised methods. The match units of Kovilpatti Taluk provide employment opportunities to many people residing in and around Kovilpatti Taluk. The present study highlights the human resource management in match units in Kovilpatti Taluk.
2.3 PROFILE OF THE STUDY AREA:

Kovilpatti taluk:

Kovilpatti Taluk was the largest Taluk in terms of revenue villages in India but recently it was split into Ettayapuram and Kovilpatti Taluks. Now Elaiyarasanendal and some other villages have been added to Kovilpatti taluk.

This area started its development earlier than 1876. The introduction of the Southern Railway, the establishment of Lakshmi Mills (1926), Loyal Textiles (1891), establishment of Government of Headquarters Offices (1911) etc., in Kovilpatti induced the physical growth of the Kovilpatti Taluk.

Population

According to the 2001 census, the taluk of Kovilpatti had a population of 262,249 with 128,711 males and 133,538 females. There were 1038 women for every 1000 men. The taluk had a literacy rate of 75.97. The total number of households was 66,525.

Geography

Kovilpatti is located at 9°10′N 77°52′E9,17°N 77.87°E. It has an average elevation of 106 metres (347 feet).

It is a fast growing area in Thoothukudi District with prominent commercial and industrial activity, including a large number of match factories, textile mills and factories manufacturing crackers. It is the gateway for entrance to Tirunelveli and Tuticorin districts from the north and west, located 100 km south of Madurai city, 55 km north of Tirunelveli Town and 60 km north-west of Tuticorin.

Kovilpatti Taluk is situated on the National Highway No.7 which connects Varanasi in the North and Kanyakumari in the South. Kovilpatti town lies approximately 658 m above mean sea Level, which gives a unique geographical look to this town. It has
a small hill to its south east known as Swarna Kathiresa Malai. The deity is Lord Muruga. Because of its height, the town is airy. The postal Pin codes are 628501, 628502 and 628503.

The Lakshmi Mills and The Loyal Mills are the major industrial establishments in Kovilpatti which provides both direct and indirect employment to around 75000 people in Kovilpatti Taluk.

Kovilpatti is also known for Hockey. 'The Kuppusamy Naidu Memorial Tournament' happens every year for around 15 days and hockey teams from all over India participate in this tournament. From 2009 it is conducted by K.R Educational Institutions as Lakshmi Ammamal All India Memorial Hockey Tournament.

Kovilpatti is the second largest town in Thoothukudi District and it is well-known for its matchworks. Therefore the researcher mainly concentrated Kovilpatti Town rather than other places in Kovilpatti Taluk. Kovilpatti is Matchless city of Matches.

Kovilpatti is very well known for 'Kadalaimittai'(sweet peanut cake). This is made out of groundnut/peanut and other added flavours.

Annarathna Match Industries, Rose Matches (P) Limited, Comorin Match Industries, Liberty Match Company (P) Ltd., East India Match Industries & Kamachi Match Works are a few top companies manufacturing Safety Matches in this Kovilpatti Taluk.
Manufactured matches from Kovilpatti and surroundings are delivered to all the States of India and also abroad. Consequently, transportation plays a major role in Kovilpatti Taluk.

**Notable people born in and around Kovilpatti Taluk**

- Subramanya Bharathi, nationalist poet, Ettayapuram.
- V. O. Chidambaram Pillai, freedom fighter, Thoothukudi.
- Veerapandiya Kattabomman, freedom fighter, Kayattar.
- Charle, Tamil film actor
- Vivek, Tamil film actor
- Konangi, writer
- Ki. Rajanarayanan, the Tamil writer
- s. karthikeyan, Artist
- G.Muthusamy, Weight Lifter
- S.Sathyar Karkuvel, National level Handball & Basketball player
- ki.Raja narayanan,Idaiseval, writer, Sahithya Academy Awardee.
- Vaiko, Political Leader.

**Educational Institutions in Kovilpatti Taluk**

**Schools**

- The Lakshmi Mills Higher Secondary School
- The Lakshmi Mills Nursery and Primary school
- The Lakshmi Mills West(Tamil Medium) Colony School
- The Lakshmi Mills East(Tamil Medium) Colony School
- Kammavar girls Higher secondary school
- CKT Matriculation Higher Secondary School
- Govt. Girls Higher Secondary School
- V.O.C Govt Boys Higher Secondary School
• Viswakarma High School
• Nadar Higher Secondary School
• Nadar Middle School
• Kamaraj Matriculation Higher Secondary School
• John Bosco Matriculation Higher Secondary School
• St. Pauls Matriculation Higher Secondary School
• Seventh Day Adventist Matriculation Higher Secondary School
• A.V Higher Secondary School
• A.V Primary School
• The Counian Matriculation Higher Secondary School
• Everest Marriapa Higher Secondary School
• Parvathi High School, Illuppaiyourani.
• Shyamala hr Secondary School Illuppaiyourani
• Edustar International School - CBSE
• St.Johns Higher Secondary school
• St Andrews school
• Ravilla K.R.A Vidhyashram Matriculation Higher Secondary School
• Punitha Ohm convent Matriculation school, MANTHITHOPPU Road, kovilpatti
• EVA Valli Muthu High School

Colleges in and around Kovilpatti

• National Engineering College
• G.Venkataswamy Naidu College
• SSDM Arts & Science College
• Unnamalai Institute of Engineering and Technology
• Lakshmi Ammal Polytechnic
• K.R College of Arts & Science
• Oscar Catering Institute
• V.Thangapandian Memorial Pasumpon Teacher Training Institute
• Punitha ohm Teacher Training Institute
• Mano college, Nagampatti, Pasuvanthanai-Post
 Important Temples in Kovilpatti Taluk

- SHENBAGAVALLIAMMAN TEMPLE: It is a main temple in Kovilpatti Taluk. It is located in Kovilpatti town. The statue of amman is very high and appealing. Sithirai Theertha vari is very famous around this area. People throng for the festival.
- KATHIRESAN TEMPLE: This temple is situated in a hillock. The deity is Lord Muruga called Kathiresan. One cave is situated another side of the hillock. On the entrance one stone is like the gate carved like the opening. People say that the tunnel is up to Ettayapuram Jaminthaar,s bungalow. But nobody ventured to go into the cave.
- Krishna Temple, It is also located at main part of the Kovilpatti town.
- Pathirakali Amman Koil: This temple is located in pathira kalamman kovil street. And the main God is Pathirakali Amman.
- KURUMALAI Sivan Temple and Ayyanar Temple which is 10 km from kovilpatti. Kurumalai is an excellent rocky hill with more flora and fauna and the Lord shiva is located nearly 800feet high. We can see a marvelous place on the way to shiva temple where we can find water originating from a rock lively and passing through shiva linga. Water will come through the year even during peak of summer.

 Important Churches Kovilpatti Taluk

- St. Joseph Church
- St.Pauls Church
- Jesus With Us Church
- Maranatha Biblical Church
- Tamil Baptist Church New Road
- Assembly of God Church New Road
• JEM Church Muthu Nagar
• ACA Church Bharathinagari

**Places of interest**

**Ettayapuram**

It is situated about 15 km from Kovilpatti in east. The place is important as a cotton growing centre. Ettayapuram is famous, because it is the birth place of Nationalist poet “Bharathi” the famous freedom fighter. A mandapam has been constructed in memory of the poet “Bharathi”. A library is located in that building.

**Kalugumalai**

Kalugumalai is situated on the road connecting Kovilpatti and Sankarankoil. The massive dome of rock of 300 feet height approximately can be seen from far of. The place is famous for its rock cut temple called “Vettuvankoil”. A rock cut temple dedicated to Lord Subramaniya Swamy is also located at the foot of the rock. The remains of "Samana Palli" or Jain School (Place where jain saints stay) can be seen atop the hill along the Vettuvan Koil.

**Panchalankuruchi**

Panchalankuruchi is situated three kilometres, north of Ottapidaram. The famous freedom fighter Kattabomman's fort is located here. At present only the remaining of fort is seen in the site. Since it has been destroyed by the British at the end of the war in 1799, in 1975, the Government of Tamil Nadu constructed a fort in Panchalankurich in memory of the freedom fighter.

**Sankarankoil**

The Famous temple of Sankara Narayanar and Gomathiamman is situated here. “Adithapasu” festival affects large crowds during July or August of every year. This town is situated west of Kovilpatti and attracts, Pilgrims, devotes in and around districts.
Idaiseval

It is situated about 12 km from Kovilpatti in South and is the birth place of Ki. Rajanarayanan, the Tamil writer.

Koosalipatti

It is one of the areas in Kovipatti Taluk, this is the birth place of actor vivek.

Pillaiyarnatham

It is located 15 km away from Kovilpatti. It is a good peaceful village. Many years before somebody found god vinayagar with flood. That's why this village called Pillayarnatham and perumal temple, selvakalyiamman temple also located in this village. Almost 2000 people living in this village. More Telugu speaking people are living in this village. One govt.high school is located outer area of this village. In this village a lot of youngsters works in gulf countries.and equally working in army, and some people working in airforce and govt.sectors.

Entertainment

- Ramasamydas Park
- Rajaji Park
- Ram Anumannagar Park

Media

There are local channels available in Kovilpatti that serves the public with latest happenings in & around the Kovilpatti city:

- J TV
- KCV
- Pugal TV
- JAI TV
2.3.1. AGRICULTURAL ACTIVITIES IN KOVILPATTI TALUK

Kovilpatti Taluk is a dry place where the rain fall is very low throughout the year. Compare to that of other places in Tamil Nadu, the rate of rain fall is not even 1,000 mm Per Annum and entire rainfall occurs only during the winter seasons. In the early years, the agriculturists of Kovilpatti Taluk cultivated only rice, cotton and corn in their fields. The soil in this region is relatively very low fertility content. As a result the farmers do not want to do any risk by cultivating diversified verities of agricultural crops. The total cultivable area in this region is comparatively low and now a day’s majority of this cultivable area is used for cultivating rice, corn, sunflower, dhal, cotton and the like.

2.3.2. CLIMATIC CONDITIONS IN KOVILPATTI TALUK

Kovilpatti Taluk is at an attitude of 99 from the mean sea level. This is a hot region in Tamil Nadu next to Sivakasi. No lakes find a place in Kovilpatti Taluk. Since the climate is very hot and dry, it is highly suitable for match works industries rather than for agricultural operations. The period from October to December is the main rainy season. Capricious rainfall, poor fertility of soil and lack of proper irrigation facilities, affect the agriculture of this area to a great extent. The maximum temperature is 38.5˚ C and minimum 34.2˚ C.
2.4. AVAILABILITY OF RESOURCES

Large numbers of match units are located in and around Kovilpatti Taluk, because of the free and unrestrained availability of various resources. Match industry requires many inputs namely raw material, labour, marketing, finance, climatic condition and above all the entrepreneurial interest.

2.4.1. CHEAP LABOURERS

The availability of skilled labourers in this area is an added advantage for the growth of the match industry. Kovilpatti Taluk is the chief producing centre with regard to the match industry. Among the several factors, the most influencing one is the availability of skilled labourers. In the Kovilpatti Taluk area, the agricultural operations are very low; workers are available freely and cheaply. Labourers in the stud area have inherited technical skill from their forefathers and have developed it through rich experience. Nearly, all the entrepreneurs pay uniform rate of wages to the workers. The facilities such as free accommodation and free transport facilities are also provided to attract more number of workers. The necessity of trade union in match industries is meager. A match industry consists of the following work force namely, a foreman, workers, and managing staff. The foreman and the managing staffs are paid salary on monthly basis. The remaining workers are paid in piece rate basis. Foreman is the supervisor of the entire match workers in production place of match products. As he controls match works, he must be a skilled person and having the efficiency in organization. The absence of workers will result in decrease in production.

2.4.2. AVAILABILITY OF FINANCE

Finance is the lifeblood of any business activity. It is needed in the setting up of an industry. Capital is a highly mobile factor of production and it is likely to be equally available for use in any part of the country. But under certain special circumstances this factor may acquire importance. Indian Government has implemented many schemes for
development of industrial activities over a wide area in the country. In order to develop the backward regions, some places are classified as backward areas. Where the entrepreneurs would be granted various incentives like, granting of loans at low interest rates and subsidies. Almost all the match units have been availing the term loan, cash credit and bills discounting facilities. So, the availability of finance induces the entrepreneurs to start match units in Kovilpatti Taluk.

Match items especially colour matches have got more demand only during the festival seasons, but production of colour matches carried out throughout the year. So, there is a time lag between production and anticipation of demand. Hence there is considerable need for finance. Today division of labour, specialization and mechanization are adopted extensively in all match industries to produce goods on a large scale. Hence, the manufacturers need money to purchase raw materials, and converting them into finished products. In olden days, the demand for money was very little, owing to the simple nature of production and distribution of goods. Generally, match industries require finance in terms of short term loan and medium term loan. A term refers to a few years. Bankers provide loan facilities to the entrepreneurs, to construct buildings and also to buy movable properties. The repayment of loan amount will be fixed by monthly installments depending upon the quantum of loan component. Quantum of loan amount depends upon the size of the match unit ie, it may be small-scale industry whose production has no restriction. If it is cottage industry, the production has restriction, ie, 4000 bundles per year. Medium term loan is provided to acquire fixed assets such as land, building, fixtures and movable properties. Match industry requires more money for day to day operations. Banks play a vital role in financing the working capital requirements of match industry in the study area.

In order to motivate more entrepreneurs who are interested in starting business in Kovilpatti Taluk, the Indian Government has announced the areas of Kovilpatti Taluk as industrially backward area and it provides financial assistance and subsidies to the entrepreneurs who come forward to set up their units in this area. Majority of the match box producers in this area are traditional businessmen who are well off in many aspects
including technical know-how and finance. Even new entrepreneurs who are interested in commencing match units in Kovilpatti Taluk are provided with financial assistance by various agencies namely different kinds of Banks and Government Departments at a concession rate of interest. Therefore, availability of finance to run match units is not a problem in this study area.

2.4.3. AVAILABILITY OF ENTREPRENEURS

The entrepreneurs are considered to be innovators and they try to maximize their profits. Innovation means, “Doing new things or the doing of things that are already being done in a new way”. Innovation alone does not make a man a successful entrepreneur, but he has to act with a will, assuming risk and bring about a change through organization of human efforts.

The entrepreneurs who have started industrial units with their own ideas, will have much involvement in their enterprise, whereas those who have started industrial units with ideas offered by others may not have much involvement in the business. Industrial entrepreneurs are not always guided by purely economic considerations in deciding the location of their industrial enterprise.

Match manufacturers are highly innovative and should be ready to any amount of risk to achieve their goals. They have acquired this type of outlook traditionally and voluntarily and therefore, a number of match units in Kovilpatti Taluk have been set up fast.

2.4.4. MARKETING FACILITIES

As 95 percent demand of match products including wax matches, only Kovilpatti Taluk based manufacturers are meet colour matches of the country, there is no problem of marketing the match products. The entire match products of Kovilpatti Taluk are sold through the middlemen like wholesale dealers, sub-dealers, agents and retail distributors.
A few manufacturers such as Liberty Match Works and Nagajothi Match Works are having their own Distributing Offices in major cities of the country.

2.4.5. AVAILABILITY OF RAWMATERIALS:

The availability of raw materials assumes vital consideration in the department of any industry in a particular place. In most of the industries, the cost of raw materials constitutes the major portion of the total cost of production. Raw materials may be classified as “ubiquities” like clay and water, which are available everywhere and “Localised materials” like minerals, coal and sugarcane which are available only in certain places. Therefore, localized materials have an important place in an industry. The major raw materials required for match industries are Potassium Chlorate and Red Phosphorus.

The required raw materials for manufacturing match products namely potassium chlorate and phosphorus are freely and easily available in Kovilpatti Taluk. A number of distributors are distributing the required raw materials directly to the manufacturers. Apart from the local supplier, the manufacturers also get their requirements from near by places namely Sattur, Virudhunagar, Madurai, Sivakasi, Thiruthangal and Pondichery.

2.5 RAW MATERIALS REQUIRED TO MANUFACTURE MATCH BOXES

The different types of raw materials used in the production of safety matches are as follows.

2.5.1 ANTIMONY

This material is used as coating chemical compound on sides. It helps the match stick to burn immediately after striking.
2.5.2. BI-CHROMATE POTASSIUM

Bi-chromate potassium is used as an agent to produce flame in a trice. It is procured from Mumbai and other places of North India. It is used to lower the decomposition temperature of potassium, which a match needs. It speeds up the burning reaction.

2.5.3. COPPER SULPHATE

The Copper Sulphate is for mixing with tapioca flour while preparing paste for Outer and Inner Box making. Mainly it is used to prevent the box-makers from using the flour for their personal consumption.

2.5.4 CARBON BLACK

It is only colouring agent used for preparing side coating chemical component. By adding more of this material, the side-coating chemical will be in dark black.

2.5.5 CHLORATE OF POTASSIUM

This chemical is controlled products whose supply is based on the certificate issued by the Revenue Divisional Officer. The sanction of chlorate is based on the production of the previous year. The chlorate is an explosive one and therefore, the Revenue Divisional Officer will sanction the Quota after considering the safety measures taken by the company.

2.5.6 GELATINE

It is a chemical of highly explosive nature and mainly used as inside coating chemical compound. It helps the stick to burn immediately.
2.5.7. GLASS POWDER

This material is used in head composition and side coating compound. Generally, this is obtained by grinding selected glass of factory wastes or from broken sheet of glass or colourless glass. This glass powder softens at the burning temperature and acts as a binder for the other molten head. Its components, give a compact and strong ash structure. The sharp edged needles contribute to the friction properties of both the match head and side coating of the match boxes.

2.5.8. GLUE

It is the binding agent, which plays a vital role in match production. It is available in different qualities like i) Sunlight glue sheets ii) Eagle brand II quality glue iii) Eagle brand I quality glue iv) Capsule glue v) Tiger brand first quality glue vi) Bawa glue sheets vii) Tiger brand Technical glue viii) Bundle brand packing glue ix) Technical brand match special x) Shaw walace crocodile and the like. The glue must be strong enough to bind the powdered ingredients into a firm pulp, but the amount of glue present must be enough to permit easy abrasion, which proceeds ignition. The amount of binder is also limited by its function as fuel. The preparation of its solution and quality and type of glue used play an important role in quality determination and the price fixation of materials.

2.5.9. PHOSPHORUS

It is one of the fundamental components of the lead composition and of the striking surface for the safety match stick, namely, the surface of the match box. There are different grades of phosphorus namely Red Phosphorus, Excel Phosphorus and Kalpataru phophorus.
2.5.10. RED MANGANESE AND BLACK MANGANESE

It is a powerful catalyst. It is used for the release of oxygen from chlorate. This material is available in local areas like Tuticorin and Bodinayakkanur. The match units of Kovilpatti Taluk use two types of manganese namely Red Manganese and Black Manganese. The unit that wants to produce ordinary yellow flame uses black manganese and units that want to produce matches of red flame will use red manganese.

2.5.11. ROSIN

This material is used to control the velocity of propagation of flame in the match head and is supplied by the chemical units from Maharastra State.

2.5.12. SPLINTS AND VENEERS

These are the match sticks which are used for holding purpose. It is made out of soft wood. Normally, the trees used for the splints are i) Asphasia ii) Matti iii) Pala iv) Rubber and v) Aspin. The veneers are used for producing match boxes. This is also made out of soft trees. The soft wood is procured near by States namely Kerala and Karnataka. But now a days most of the match units used card board papers in strong quality to make inner and outer boxes.

2.5.13. SULPHUR

This is another important basic raw material for match production, which is supplied by both local manufacturers and foreign companies mainly from Spain.

2.5.14. WAX

Wax is a by-product from the petroleum refining industry. The different types of wax include i) Match wax, ii) R.D wax I quality, iii) Yellow wax, iv) Refined wax I
grade, v) Refined wax II grade, vi) Hard wax etc. Wax is used to impregnate match splints, so that the flame of the burning match head can ignite the splint. It has also been used to a limited extent as a component of head composition. The quality of match is based on the quantity and quality of wax used.

2.6. PRODUCTION PROCESS

There are different stages in the process of production of matches. Generally the following are the important stages.

2.6.1. FRAME FILLING

For any match unit, Frame filling is the first milestone to begin the process of production. Without this, the end stage cannot be executed. These works are carried on mostly by women workers. Primarily, they carry it at their house itself. But, now-a day they begin to come to the factory itself to do this work. Each frame contains 52 match lathes carrying 52 pits. The workers job is to fill up this frame. Then they were to clip the frame in order to tight the frame. At this process, the important raw-material to be used is `splints’, Splints refers to sticks without the head. But once these sticks are dipped into the channel they get their heads and they are called as sticks.

There are different kinds of splints such as:

a) Alpenzia  
b) Aspin  
c) Matti  
d) Rubber  
e) Murungai  
f) Palai

These are got from the neighbouring State Kerala. (Shows in figure 2.1)
2.6.2. FRAME LEVELING

This is the second stage in the process of production. At this stage, the filled splints in the pits are leveled in order to get the uniform level. The machine used for leveling is called “Leveling Frame”. The leveling is necessary to avoid the following:

1) Double splints to be replaced
2) Broken splints to be removed

2.6.3 WAX DIPPING

After frame leveling, wax dipping occupies the next stage. The wax dipping is done in order to fix the chemicals on the head of the splints and make the splints to lighten up to the head of the splints. The wax dipping process has got two stages as listed below:

(i) HEATING THE SPLINTS

At this stage, the splints are heated so that splints may be strengthened. The heating is done with a help of huge lighten generated from firewood or Lecco. Wet splints, if any are automatically dried.
(ii) WAX COATING

Next comes the wax coating process. At this stage, the splints are arranged in such a way that one third of them are plunged in the wax plate. Thus, coating is given one third length of the splints, when the splints are ignited. This wax coating automatically flows to the remaining part.

2.6.4. CHEMICAL MIXING

The production of matches contain full of scientific chemical products viz., potassium chlorate, potassium of sulphur, animal glue, black and red magnesium, glass powder, rosin and bi-chromate. These products are sometime heavily demanded in the open market. These chemicals are with reference to the mixed proportion of the head chemicals.

2.6.5. GRINDING

After that, the chemicals are subject to grinding. Since the raw materials used are in rough and rigid form, grinding becomes a necessity. If materials are put together for dipping, it will be more complex and it tells up on the quality. So, the grinding is essential. Most of the tiny sectors go for dipping without the grinding process. This adoption will be the root cause for the failure of matches during the monsoon period.
2.6.6. CHEMICAL DIPPING

Again, the process is moved towards the chemical fixation. At this stage, the foreman has to prepare the chemicals in the proportionate mix and dips the splints. If the mixing is poor or not in proportion: it will affect the marketing conditions. The matches must be produced in accordance to the “whether condition”. It means the splints must be produced in such a way that the ability to withstand even in the winter or rainy seasons. (Shows in figure 2.2)

FIGURE 2.2
CHEMICAL DIPPING
**TABLE NO 2.1**

**QUANTITY OF CHEMICALS MAINLY REQUIRED FOR MANUFACTURING 100 BANDLES OF GOOD QUALITY MATCHES**

<table>
<thead>
<tr>
<th>S.No</th>
<th>Required Head composition</th>
<th>Qty. of Side Coating</th>
<th>Total in Kgs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>-</td>
<td>0.025</td>
<td>0.025</td>
</tr>
<tr>
<td>2.</td>
<td>-</td>
<td>0.100</td>
<td>0.100</td>
</tr>
<tr>
<td>3.</td>
<td>2.500</td>
<td>0.100</td>
<td>2.600</td>
</tr>
<tr>
<td>4.</td>
<td>0.500</td>
<td>0.500</td>
<td>0.550</td>
</tr>
<tr>
<td>5.</td>
<td>0.100</td>
<td>0.100</td>
<td>0.200</td>
</tr>
<tr>
<td>6.</td>
<td>0.050</td>
<td>-</td>
<td>0.050</td>
</tr>
<tr>
<td>7.</td>
<td>0.600</td>
<td>-</td>
<td>0.600</td>
</tr>
<tr>
<td>8.</td>
<td>4.500</td>
<td>-</td>
<td>4.500</td>
</tr>
<tr>
<td>9.</td>
<td>2.000</td>
<td>-</td>
<td>2.000</td>
</tr>
<tr>
<td>10.</td>
<td>5.500</td>
<td>-</td>
<td>5.500</td>
</tr>
<tr>
<td>11.</td>
<td>-</td>
<td>0.100</td>
<td>0.100</td>
</tr>
<tr>
<td>12.</td>
<td>0.100</td>
<td>-</td>
<td>0.100</td>
</tr>
<tr>
<td>13.</td>
<td>1.200</td>
<td>-</td>
<td>1.200</td>
</tr>
</tbody>
</table>

Source: Complied from oral interviews held with experts of safety matches in match units manufacturing in the study area.

It is clear from the Table 2.1 that a number of chemicals are required to make match products.
2.6.7. DRYING THE WET FRAMES

The dipped frames are in the wet farm, since the chemicals are in the form of liquid. So, they have to be dried. The drying is done through the use of fans. There are Separate rooms for this purpose. The dangerous place in a match house is said to be the drying room, where more number of head frames are kept for drying.

2.6.8. INNER AND OUTER BOX MAKING

It is the first process in making match products. The box making is done by female workers, children and aged persons at their home. These workers are paid on piece rate basis. There are two boxes namely outer box and inner box to be assembled. The outer box is made by both wooden veneer skillets and cardboard skillets. The raw materials required for making inner box are veneers, wrapping paper cut to size and paste.

The inner box is also called as drawer carries the match sticks. The box is made in different sizes to suit the two types of outer box. Long strips of cardboard with 1.5 cms breadth are supplied to the workers. There are pressings in many places for the cardboard sheet. Labourers fold them into a rectangular sized box. Then they paste it with the bottom, which is supplied by the firms. Generally, a woman labourer takes 20 minutes to complete inner box making for a gross.

As the first stage in outbox making, the outer box veneer skillets properly greased to enable proper folding are dipped on both sides to a depth of about five to six mm, in a colour solution and then left to dry in air. The veneer skillets should not be allowed to dry for a long time because they may break in the process of box making. More over, care should be taken that there should be no moisture.

In the outer box making, two sides of the outer box are painted with a mixture of red phosphorus, bi-chromate and glue. Only men labourers do the chemical painting process from the long cardboard sheet. Generally, a labourer takes five minutes to
complete one gross of outer box making. It takes 15 minutes for a woman labourer to do outer box making for a gross (shown in figure 2.3 and 2.4)

FIGURE 2.3
INNER BOX MAKING

FIGURE 2.4
OUTER BOX MAKING
2.6.9. BOX FILLING

In this process the workers are filling the match boxes with the wooden sticks dipped in sulphate. The female workers are mainly doing box filling work. The standard number of sticks is to be filled in a match box is 50 sticks. It takes 20 minutes for a woman to fill in match sticks for 5 gross of boxes which is called a bundle (shown in figure 2.5)

FIGURE 2.5
BOX FILLING

2.6.10. BOX LEVELING

After the completion of filling the splints into the boxes, the boxes are filled into the “plates” where it will be highly suitable for leveling the box for the purpose of side coating. Box leveling is the next stage to the box filling. At this stage, the waste boxes are leveled in an informed way for side coating.

2.6.11. SIDE CHEMICAL COATING

The side-chemical coating on the outside of the match boxes help the match sticks to burn immediately after striking against the surface. For this purpose, the sides of the
match boxes after box filling first arranged in the specially designed frames. Each frame contains four wooden pieces, rectangular structured by dips, to accommodate 100 match boxes. The arranged boxes will be brushed with side coating chemicals on both sides. After this process, again these boxes are allowed to dry and then they are ready for the next processes of band rolling and labeling. Since the sides of a match box are coated with chemicals, the chemical dipping workers also do it while they are paid mainly on time rate and in certain units on piece rate also paid.

2.6.12. DRYING THE SIDE COATING

The side frames must be dried before the use of band rolling, because the boxes shall be uniformed among themselves. The reason is that the reaction of the glass powder will result in high tightness among the dried side boxes.

2.6.13. BAND ROLLING AND LABELLING

Band rolling and labeling are the two activities made simultaneously. They give the finishing touch to the match manufacturing process. The labeling is done immediately after band rolling, which follows box filling and side chemical coating.

The band rolling is a strip of printed paper in different colours to specify that match units in various sectors have paid excise duty on the production of the match boxes. To enforce the collection of the Central Excise duty and to prevent fraud, the Government of India prints band rolls, which are thin strips of paper, specify the number of sticks and the duty collected. The Central Excise duty is collected on the basis of matches produced. The government is determining the duty on the basis of quantity of production and kinds of raw materials used. There are different band rolls for different sectors, which are identified by specific colours. Table 2.2 shows the different colours of band rolls along with their respective sectors.
### TABLE 2.2
COLOURS OF BAND ROLLS ISSUED BY THE CENTRAL EXCISE DEPARTMENT

<table>
<thead>
<tr>
<th>S.No</th>
<th>Colours of band rolls</th>
<th>Nature of the Sectors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Red</td>
<td>Small Scale Sector which uses cardboard for box making.</td>
</tr>
<tr>
<td>2.</td>
<td>Maroon</td>
<td>Power Sector units (WIMCO)</td>
</tr>
<tr>
<td>3.</td>
<td>Yellow</td>
<td>Cottage Match units which use veneers for box making.</td>
</tr>
<tr>
<td>4.</td>
<td>Green</td>
<td>Other than 50 sticks per box production.</td>
</tr>
<tr>
<td>5.</td>
<td>Blue</td>
<td>Small scale sector which used veneers for box making.</td>
</tr>
</tbody>
</table>

Source: Office of Assistance Collector of Central Excise, Kovilpatti Taluk.

All the match units are obliged to wrap a band roll strip over each match box, across the open end. Labeling is process by which the trade labels are pasted over the ends of band roll, which makes it necessary to tear off the band roll to open the match box. The trade labels are printed piece of paper containing the name, embalam of the brand, producer, place of production and the like to identify the manufacturers of the matches. Since band rolling and labeling are very simple activities, women workers do this process easily. They are paid wages on piece rate system. (Shown in figure 2.6)
2.6.15. BUNDLE PACKING

It is the final process involved in match production. In order to market the match products manufactured by match units, it is highly necessary that the match boxes to be well packed. It packed with corrugated bundle paper. This paper is having the capacity to bear the inner materials even during the winter or monsoon period. There are different types of packaging methods namely, one dozen packing, Gross packing and Bundle packing. After the packing is over, the products are sent to different places for marketing. All these bundles are subject to clearance by the Central Excise Department. (Shown in figure 2.7)
2.6 MODERN TYPES OF MATCHES PRODUCED IN KOVILPATTI TALUK

At present, there are different types of matches are produced so as to suit to the needs of different classes of people. The most common are the following

A. HOUSEHOLD, KITCHEN OR STANDARD MATCHES

These kinds of matches consist of ignition head, tender (made by soaking the splinter nearest the head in Paraffin Wax) and the handle (the un soaked portion of the splint). The splints are usually treated with some retardant, such as ammonium phosphate to prevent after glow when the match is extinguished. This type of match occurs in a wide range of box and splint sized.

B. VESTA MATCHES

These matches have short sticks relation to their cross section. They were originally made from wax and are generally regarded as smoker matches.
C. DOUBLE-DEP (OR) “BIRD’S EYE” MATCHES

These are on the North American Continent as a form of strike-anywhere matches, although in Europe they are restricted to the quality matches. A bulb of combustible material is interposed between a fast ignition head and the tinder of the stick. They combine high sensitively with safety in transport. The construction enables a smaller quantity igniter is kept from contacting the adjoining tips by the insensitive bulb below it.

D. WAX MATCHES

These matches, which are popular in Latin countries, have their ignition head on the end of a short length of wax taper formed from paper or cotton filaments. The whole stick is therefore tinder. As they are difficult to extinguish, they are not permitted in certain countries because of the danger of starting fires.

E. BOOK MATCHES

Matches of this type are made by stapling a comb of wood or cardboard matches inside a cardboard cover. Their method of burning is the same as a standard match. Wooden combs are used in the Western Countries. Book matches are used as an advertising medium, especially in the U.S.A., and the popularity of the book match stems entirely from its suitability for this purpose, which is much influenced by fiscal considerations from country to country.

F. PYROTECHNIC MATCHES

Commonly called as “Bengals” these have a tinder substance below the head that is designed to burn with a bright flame and tined with one of the characteristic colours of metallic salt. The splints serve as a handle only “Life Boat” and “Wind Proof” matches. Matches of this type share a common design and are similar to “Bengals.” The tinder
substance, which is spread along the splint below the head, produces a more positive reaction than the combustion of wood and paraffin wax; with the result that it cannot be extinguished by wind or water spray. Such matches may be sub-divided into “fuses” in which the tinder substance burns strongly without flame (although ignition may be passed on) and “flames”.

G. WATER PROOF MATCHES

As both the common match and the striking material on the side of the box are hygroscopic, many attempts have been made to make them water proof, however, more successful of proofing, the higher the cost and the more difficult of the ignition. Use of water proof matches is therefore restricted mainly to the armed forces.

H. WIND PROOF MATCHES

Matches of this type have the tinder substances spread along the splint below the head which produces a more positive reaction than the combustion of wood and paraffin wax, with the result that it can not be extinguished by wind or water spray. Such matches may be sub-divided in to fuses, in which the tinder substance burns strongly without flame.

2.8. SUMMARY:

Match products are essential items in the day-to-day life of the people particularly in rural areas. The demand for the match products is ever growing. Majority of the match products are produced in and around the Kovilpatti Taluk. Kovilpatti Taluk is a historical and traditional area where large numbers of match units are located. The climate condition in and around Kovilpatti Taluk is highly dry in all the months of the year except the last quarter of the year. Generally the match industry requires hot climate condition and therefore, Kovilpatti Taluk is an ideal place for starting match units. Apart from the favourable climate conditions, the inputs required to manufacture match...
products namely, raw material, labour, finance and technical assistance are freely available throughout the year. Since, Kovilpatti Taluk is an industrialized place in Thoothukudi District, it grows at a faster rate in many angles including physical size, population, infrastructure facilities and the like.

CHAPTER REFERENCES

1. History and Growth of Kovilpatti Taluk, A magazine published by Chamber of Match Unis, Kovilpatti.
5. "Primary Census Abstract - Census 2001". Directorate of Census Operations-