This was an explosive revolution that gave hat lovers the freedom to wear hats made to compliment with their choice of style, colours and poise. This boom later became the doom of many a hat maker who lacked innovative creativity and foresight. Instead of the normal cut and sew that was the main characteristic of fabric hats, there arose the need to experiment with some new materials. This saw the emergence of cinnamay, thus opening the floodgate to create locally, hats that can meet and even surpass international standards. As earlier hinted, the swelling ranks of millinery venture should not include mere enthusiast or people with just the basic skills of hat making. The future of the business belongs to millinery of creative dynamism. This cannot be compromised neither can it be over emphasized. It is needless to start a venture that lacks the roots of survival. If you are daring, adventurous, innovative and creative; if you are willing to horn and sharpen your skills to constantly add value to it; then you are welcome on board.

(2) CAPITAL OUTLAY

In the eighties, when I stepped into the uncertain terrains of the industry, N30 was my initial capital . It may sound ridiculous to contemplate such amount today as your capital outlay for hat making. Before you set out, you must determine your initial level of operation as follows:

(A) Small scale (experimental)

(B) Medium scale (experimental)

(C) Factory scale (Beneficial)

SMALL SCALE:- Assuming you go for small-scale approach, which in any opinion is the ideal way to start, your starting fund may be as minimal as N15,000. This scale is experimental in nature and so offers the opportunity of learning without undue fear of failure. At this level, friends and family members who are normally the first to notice skill and creativity will also be there to offer patronage. At this level, one only needs the basic tools of rudimentary capacity. This, of course is not a picture of a business with dividends. At this level, dividend is derived mainly from the fact of tenacity as observable and measurable increase unfolds to reveal more beneficial prospects.

MEDIUM SCALE: The ideal thing is to start small and grow. Anyone contemplating millinery business from the medium scale level must have worked with others in the industry. Experience increases the prospect of a broader starting platform. At this level, one more hand may be needed to complement personal efforts. Equipment base must necessarily be raised to accommodate increased manpower. An initial capital outlay of about N30,000 may be required. While any extra space within a one-room living arrangement may be enough for small-scale level, medium scale level may require at least a 10 by 12 inches room space.

FACTORY SCALE:

Anyone venturing into this scale must have paid their dues in the industry. At this level, a mixture of talent, creativity, and a sound working experience of the 'bolts and nuts' of the industry must come into play for maximum benefits or profit. If we assume that this level should attract our focus as a case study then other variables may be taken into consideration (See Chart A).

(3) EQUIPMENT

Graduation is a strong factor in the procurement of millinery equipment or tools. At the small or experimental level, only the basics will do. Scissors is needed for general cutting while thread and needle are needed in the finishing or coupling of design pieces or component parts. Basic hand sewing skills at this level may eliminate the need for a standard sewing machine. Beyond this level, sewing machine becomes a vital equipment and paramount factor of speed and better and competitive finishing. At the factory level, it is obvious that considerations must be made to determine the extend of requirement as it concerns expandable factors of equipments, manpower and space.

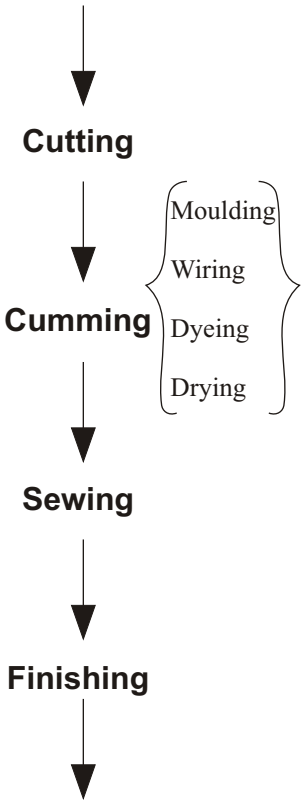
(4) MANPOWER

It could be catastrophic to attempt setting up a hat factory unless one is or aspires to be a passionate milliner. At the rudimentary level, the facilitator should experience all the basic aspects of the manufacturing process.

At the medium scale level, an extra manpower may be needed for the manning of the sewing machine. The factory scale always posseses the demand for specialization. For instance, the following procedures may require varying degrees of manpower;

CHART B

PROCEDURE CHART



(5) LAND SPACE:

As Chart A indicates, hat making does not require a lot of space. At the level we described as small scale, an extra space within the living room will be just fine. At this "one man show" level, you don't need a sewing machine, which can pose a space problem. One can get outside sewing service at a little cost. It should also be noted that the authentic industrial millinery machine is very expensive. This is why a measure of doggedness and creative inventiveness is needed in order to adapt and improvise with the easy to procure, common sewing machine. Even at the factory level of high quality production, a commensurable space mileage can still be achieved within the confines of a regular three bedroom flat.

(6A) SOURCES OF MATERIALS AVAILABLE:

Every high street milliner, more or less depends on imported materials to get their job done. Practically speaking, all the tools, machines, materials and accessories need to be imported. More than 80% of vital machines and tools are imported from England. They are also heavy exporters of pre-moulded straw hats and straw based sheets, as well as the latest "miracle" material called cinnamay. The Americans are noted for their high-tech exquisite accessories. Their beautifully cultured feathers and special flowers are in high demand for that special touch of sophistication. China and other far-east nations have followed suit. Documented data may not be available as to the bulk of materials imported but personal investigation and research coupled with our company's experience indicates that, the volume of import runs into billions of naira with foreign exchange considerations in place. Within the last four years, some companies I know have expended millions of pounds on straw hat and straw sheet alone, not to talk of other equally important incidentals. Inspite of the obvious implications and cost of importation, the aspiring milliner can take solace in the fact that the raw materials are locally available. For more than ten years of my active involvement in the business, it was not so. The few of us who were serious about the business sourced and imported our materials. Now we still don't make the materials, but you can easily source and purchase them locally.

(6B) RESEARCH CONSIDERATION:

It seems right to use this opportunity to advocate for genuine research into our local hat making materials. The government, corporate bodies, universities, science and agro-allied bodies should come together and create research teams that will look into the prospect of processing our local raw materials into world class accessories and base materials. Our local straw from raffia and other palms can only give us "local" looking hats that can only earn us disdain in the international scene. We have banana raffia and palm trees, surely we can acquire and master the techniques needed to process and transform these natural materials into sophisticated economy - boosting raw materials, for local and export uses. America and

China can eat their chicken and make sure we are the ones to pay for it. They separate the feathers, process them into beautiful ornaments or accessories and get us to buy them at prices higher than the chicken that produced them. We cannot continue to pretend to be part of the global market while wasting our natural "heritage". We can eat our chicken and have it.

With today's high-tech reality and information revolution; it takes almost nothing to produce gum, scissors, local wooden moulds, wire gauze, hammer, needles etc. The fashion business, all over the world is big business with great prospect of spinning vast foreign exchange earning. Any amount of research that goes into the enhancement of its potentials is highly recommended and commended.

(7A) PROFITABILITY AND TARGET MARKET:

Over the centuries all over the world, ample evidence exist to show that hat wearing, as a complimenting accessory of fashion have come to stay. Quality may improve from one level of sophistication to another, design, shape, style and material may differ from time to time but people will always wear hats. As long as we have shoes, handbags and other accessories, we will always have hats. This should be sweet music to all aspiring milliners. Currently in the country, we have a glut of pretenders in the hat making industry. This is nothing to be bothered about because your creativity, standard and quality on the long run will put you ahead and swell your bank accounts.

The hat business in Nigeria is booming and everybody is attracted. Very soon market forces will swing a deadly blow on milliners with weak foundation and reputation and sanity will be restored to pave way for the ultimate reward of the few serious minded producers who have gained international acceptance.

(7B) DOMESTIC MARKET:

The domestic market is quite large,. it has the potential for rapid and dynamic explosion. More than 90% of Nigerians have religious inclinations. A large chunk of these are christians. Contemporary charismatism not withstanding, millions of orthodox christians and others are opting for more trendy fashionable headgears as a replacement for the traditional but less attractive head ties. Lump this together with countless church and traditional wedding ceremonies not mentioning the "owambe" parties; and you have a large pool of hat market.

(7C) FOREIGN MARKET:

My personal experience shows that, the foreign market for Nigerian hats may well exceed that of the local in leaps and bounds. Nigeria appears to have a traditional attitude of disdain against their own locally produced materials even when such is internationally recognised and accepted. Personally I receive more accolade abroad than at home. Each time I am running hat shows abroad, my stand is always a beehive of activities as both black and "oyinbos" are amazed or even shocked at the magnificent uniqueness of our designs. In one particular hat show in Miami Florida, some white women were openly weeping as they perused the designs we had put on display. Barring stiff market regulations of the so called advanced nations, a lot of in-roads would have been achieved in this regard. They just love our hats. Care and tact must be observed while dealing with their agents, or you could be duped. The "africanness" of our designs is a clear advantage that must be fully explored by all who can venture into the open markets. We also can have several virgin lands begging to experience the unique creativeness of our hats. Africa alone - south and west coasts, represents a huge "monster" market that may prove difficult to saturate. Out there is a vast untapped market waiting for the bold and daring who won't stop until our economic status and dignity is restored.

(CHART A)

SMALL SCALE	EQUIPMENT	MANPOWER	LANDSPACE	CAPITAL
*Experimental *Minimal fear of failure *Friends and Family members provide initial patronage	*Scissors *Thread *One Sewing Machine *Wooden Mould *Bottle of Gum *Hammer *Thick Paper *Wire gauze *Fabric	1 Person	Extra Space within one room	N5,000 and above
MEDIUM SCALE				
*Experience *Minimal fear of failure *Profit prospects	*More Scissors *More Thread *One Sewing Machine *Display Hangers *More Wooden Moulds *Moulders *Hammers *Wire gauze *Gallons of Gum Fabric & Accessories	At least 2 Persons	10 by 12 inches room space	From N30,000 and above
FACTORY SCALE				
*Experience *Talent *Creativity *Profit *Commercial Advertisement	Industrial Amount of: *Scissors *Sewing Machine *Wooden Moulds *Hammers *Gum *Wire gauze *Local Fabric *Imported Fabric *Moulders *Fabric Accessories Flower Bows Beads *Display Hangers etc.	At least 6 Persons	3 bedroom flat (Not included in Capital) *Space for display included	From N50,000

EMPLOYMENT CREATION AND OPPORTUNITIES IN THE MANUFACTURING SUB-SECTOR: *THE CASE FOR NEEM TREE IN NIGERIA*

Dr. E. M. Okonkwo

BY
DR. E. M. OKONKWO*

INTRODUCTION

Neem, (**Azadirachta indica A. Juss),** commonly called "Dogonyaro" in Nigeria, belongs to the Mahogany family Meliaceae. It is one of the most versatile and ecofriendly trees, and is widely distributed in south Asia and parts of Africa including Nigeria. Neem is a large evergreen and fast growing tree native to Indian subcontinent. It is universally accepted as a wonder tree exhibiting a high degree of heterogenicity and can tolerate a long dry season with rainfall as low as 130mm. It thrives well on both dry and shallow soils. Neem begins to bear fruit in 3 to 5 years and becomes fully productive in 10years. Neem tree yields between 30-50Kg of seed per tree yearly. The neem tree is known to contain several classes of useful chemicals such as carbohydrates, proteins, sulphur compounds, alkaloids, phenolics, aromatic esters, steroids, trepenoids etc, which gives the tree its plethora of biological activities. Virtually all parts of the plant are useful in various ways and for different purposes. Medicinally, it is said to be used for heart diseases, lowering of cholesterol, skin ailments, anti-malarial, anti-bacterial and anti-fungal infections, arthro-rheumatism and similar body ailments. Its extracts are reputed to inhibit increases in blood sugar levels. Its dentistry properties are very well known as we use it as local mouth cleaner (chewing stick) before the popularization of modern toothpastes.

The leaves, seed, fruit, flowers, bark, root, etc. are all used in various preparations and concoctions or portions for a number of medicinal purposes. For thousands of years, millions of Asians and indeed people in other parts of the world, have used neem for the cure of various ailments ranging from dental, stomach, dermatological, and to such diseases like malaria. Locally in Nigeria, its leaves are boiled and taken for cure of malaria and jaundice..

Neem has many industrial uses. Since it grows rapidly, it can be cut for timber after about 5 to 7years, while its uses as fuel, wood, masts and poles are commonplace. Its most prominent large-scale use nowadays is in shelterbelts and general afforestation projects and is a great asset in providing shade in the extremely hot cities and towns in Northern Nigeria. You only need to go to Maiduguri, Katsina, Sokoto, Yola and other towns in that ecological belt to appreciate this quality of the neem tree.

In the area of agriculture, neem and neem extracts are found to be extremely useful. Neem oil is one of the best organic pesticide but its other products such as leaf extract are also used on stored products. Its cake (after oil extraction) when mixed with the soil rebuilds soil nutrition and improves its composition/structure generally and controls nematodes.

Environmentally, neem has a reputation as a natural air purifier, exhaling out oxygen and keeping the oxygen level in the atmosphere balanced. Neem's ability to rehabilitate degraded wastelands has been established. It also plays a vital role in controlling soil erosion, salination and preventing flood.

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2.0 OPPORTUNITIES IN THE MANUFACTURE OF NEEM BASED PRODUCTS

The neem tree is suggestive of a biochemical factory producing several active compounds. All these compounds can be formulated into end products for human use. Consequently a large number of manufacturing outfits, at micro, small, medium and even large-scale levels are possible. The neem industry therefore provides opportunities for livelihood for our citizens whether rich or poor.

For example a living can be made daily from just collecting the ripe seeds which fall on the ground. It has been estimated that an individual can generate up to N6,000 in one month through picking the seeds. The Nigerian neem seed and indeed the West African variety have greater export potential than those of the rest of the world. This is due to its higher active ingredient content of three times over. The neem oil from the seed is a marketable product on its own and can be extracted from the seed through cold press or by using solvents. Expellers for the cold press extraction are obtained locally, whose prices can be as low as N20,000.00.Other neem-based products manufacture of moderate investment are the soap, toothpaste, cosmetic, animal feeds etc. Investments of medium to large scale which require discussing in more details are the neem-based pesticide and the fertilizer.

3.0 INVESTMENT PROFILE OF A NEEM BASED PESTICIDE COMMERCIAL PLANT

Neem seeds contain bio-active fractions that can help in pest management strategies and help save our environment. The bio-activity of neem based products has been extensively evaluated and proven. Because of the fear of toxic residues in food products associated with the use of chemical pesticides, there is a growing need for pest control agents of plant origin which do not leave any toxic residues. Although many plant chemicals have been reported to be suitable for this, neem is the only plant from which the bio-pesticides are commercially manufactured, found effective, eco-friendly and acceptable to the farmers. Neem pesticides are now increasingly used in India.

The most active ingredient of the neem seed is azadirachtin. It belongs to the group of compounds called tetranor-triterpenoids. It is structurally similar to insect hormones called ecdysones which control the process of metamorphosis as the insect pass from larvae to pupa to adult. Azadirachtin seems to be an ecdysone blocker, preventing the vital hormones from being released. Insects then will not molt, thus breaking their cycle and causing the death of the insect after some days.

Pest control, as practiced today in Nigeria and most developing countries, relies mainly on the use of synthetic pesticides. Their use often leads to the contamination of terrestrial and aquatic environments, damage to beneficial insects and wild biota, accidental poisoning of humans and livestock and the problems of pest resistance and resurgence. A World Health Organisation and United Nations Environmental Programme report (WHO/UNEP 1989) estimated there are 1 million human pesticide-poisoning cases each year in the world, with about 20,000 deaths, mostly in developing countries.

3.1 Production Process of Neem-Based Pesticide

Production of a neem based pesticide begins with crude neem oil solvent extraction batch process. Briefly the process is as follows:

i. Cleaning

Dry neem seeds are cleaned before processing. The cleaning involves removal of stones and other foreign matter from the seeds. Cleaning process generally takes place manually using sieves.

ii. Dehulling

Dehulling is the process of breaking the seeds without damaging the kernels. The kernels are isolated from the shells with the aid of a blower.

iii. Pulverization

After the separation of the kernels, they are passed through a pulverizer where the kernels are turned into fine uniform powder.

iv. Extraction

This is a batch process operation in which solvent is added gradually to the neem seed kernel powder. After the extraction, the extract, now called miscella, pass through the evaporators for the separation of the solvent. The technical grade liquid product is collected in a storage tank.

v. Formulation

The above technical grade liquid azadirachtin concentrate is blended with a diluent, an ultra-violet screener and a surfactant to obtain the bio-pesticide formulation.

Fig. I. Shows the process flow chart for the bio-pesticide formulation.

3.2 Project Details

i. Plant size

The size of the neem bio-pesticide plant being advocated is for a 400MT on seed consumption per annum. This is a small to medium scale factory and will require a land allocation of at least 100 x 150m^2 to accommodate the solvent extraction, formulation, and enrichment plants as well as the storage, utilities and laboratory facilities and an office.

ii. Plant and Machinery

The plant and machinery required for the construction of a 400MT capacity pesticide plant are as follows:

a. Seed Receiving and Processing sections

- Weigh bridge
- Platform weighing machine
- Moisture testing meters
- Rotary seed drying
- equipment
- Small conventional expeller
- Dehullers
- Hull and kernel separator
- Pulverizer.

b. Active Ingredient Extraction Plant

- Extractors
- Miscella receiving tanks
- Solvent storage tanks
- Intermediate tanks
- High vacuum falling film evaporator
- De-solventizer
- De-solventised cake remover
- Mechanical seal pumps
- Oil transfer pump
- Instrumentation
- Insulation and safety installation

c. Formulation Plant

- Technical holding tank
- Formulating solvents holding tank
- Mixing vessel in carbon steel
- Capacity SS tank
- Closed Neutch Filter
- Formulation receiving tank
- Packing machine
- Mechanical seal pumps
- Vacuum pump
- Instrumentation
- Insulation and safety installation

d. Utility Services Equipment

- Steam Boiler
- Water softner with pumps and re-generation tank
- Cooling tower with water circulation pumps
- Water chilling plant
- Hot water tank
- Electrical control panel

e. Quality control Lab Equipment

- High performance Liquid Chromatograph (HPLC)
- Metler Analytical Balance
- U.V. spectrophotometer
- Soxhlet Apparatus
- Glassware and Miscellaneous items.

3.3 Investment Cost

The cost of plant and machinery listed above, is N40million. The raw materials per annum as feedstock to the plant are: neem seed (400MT), methanol (32,400Kg), Butanol (16,200Kg), Aromax (56,980Kg) and Emulsifiers (32,400Kg). The cost of these inputs is given as N51 million, including taxes and duties on import.

Utilities, overhead and labour expenses have been estimated at N 44million while a contingency of N 3.0million has been allowed.

4.0 PRODUCTS

The total Bio-pesticide produced per annum is estimated at 162,000litres on one-shift basis. The selling price of the pesticide is N950/litre.

Also generated is the cake residue by-product. About 126,000Kg cake is generated and is sold at N13,000/MT

5.0 ORGANIC FERTILIZER PRODUCTION

Neem cake, by-products of bio-pesticide and expeller productions, is an excellent source of organic fertilizer. The dual activity of the cake as fertilizer and as pest repellent has made it a favoured input. Neem leaves are also being used to enrich the soil. Together, they are widely used in India to fertilize cash crops. When Neem Cake is ploughed into the soil it also protects plant roots from nematodes and white ants. Neem seed cake also reduces alkalinity in the soil, and acts as a nitrification inhibitor, thereby reducing ammonia volatilization, urea hydrolysis and leaching when urea is coated with it.

As a fertilizer, one tonne of neem cake contains the following:

Nitrogen (as Nitrogen)	35.60Kg
Phosphorus (as phosphoric acid, P_2O_5)	19.00Kg
Potassium (as potassium oxide K_2O)	20.007Kg
Calcium (as calcium oxide, CaO)	10.78Kg
Magnesium (as Magnesium oxide, MgO)	12.78Kg
Sulphur	20.00Kg

This is over seven times the Nitrogen, phosphorus, and magnesium contents of farmyard manure and over three times the potassium content and over twice calcium content of the same farmyard manure.

Neem cake coated urea are commercially available in India. Neem cake can be used as fertilizer by applying it alone to the crops or in blending with other natural organic matter or solid mineral resources. It can be applied in the powder form or in granular or briquettes form. Investment cost for establishing a neem cake based fertilizer plant varies from as low as N10,000.00 to as much as N100m depending on size and type.

The basic steps in the production of fertilizer using Neem Cake are pulverization of the cake to the desired particle size and blending the pulverized material with other nutrients in a blend feeder. The product is then granulated using drum or pan granulator, and dried in a dryer. Next is the screening to obtain final product of uniform size and finally cooling in a cooler.

The National Research Institute for Chemical Technology (NARICT), Zaria is currently constructing a 5tonne per hour plant based on the Neem cake.

6.0 NEEM ENTERPISE DEVELOPMENT IN NIGERIA

Although the neem tree has been known in Nigeria for several decades, having been introduced in the late 1920s from Burma and subsequently from Ceylon and India, no attempts has been made to develop a trade in its by-products. With exception of the neem leaves being used locally for the cure of malaria and a few herbalists adding some other parts of it in the their concoctions, there has been virtually no appreciation of the multiple benefits of this tree.

The reality of the benefits of Neem has been brought to the knowledge of Nigerians by no other than the President and Commander-in-Chief of the Armed Forces of Nigeria when on 20th April, 2004, he presided over a meeting with selected Governors, Ministers, his key officials, a few Government Agencies and an International Company interested in investing on Neem in the country. Mr. President " Stressed that at this time, when government was trying to widen the country's base of revenue generation and promote export and import substitution activities, it was expedient to see what could be done on the area of Neem" . He thus directed that Neem trees and products be commercialized on small, medium and large scale bases so as to popularize their uses as has been done in India and some other Asian countries. Mr. President constituted a committee with the following terms of reference:

i. Develop and popularize the growth of the Nigerian high quality species of neem generally in Nigeria, but specifically in the four states of Borno, Katsina, Kebbi, and Zamfara.

ii. Develop medium and small scale processing facilities in the four states for Neem to produce fertilizer, pesticides and Neem oil for soap making and any other products that could be produced for internal market.

iii. Promote export market for Neem products.

To further practicalise his commitment to the project, Mr. President approved the

establishment of two Pilot demonstration plants for the production of neem pesticide and neem oil in Katsina and Kebbi States respectively. He also challenged the four target States to raise large numbers of neem seedlings for planting to ensure sustainability of the new industry.

Thus the advent of the enterprise development in the Neem industry has begun in Nigeria, with a lot of prospects. The local population could gain materially by collecting the seeds which fall from the trees on daily basis; unemployment and unskilled youths could be engaged in the many low capital cost enterprises that would spring up producing oil, soap, neem extracts and other products.

The development of a neem enterprise industry is likely to lead to a huge extension in tree planting by small peasant farmers who would now know that they would not have to wait for 10 to 15 years for the tree to develop as in other forestry projects. This can be achieved in the second year when by carefully plucking some of the leaves of the tree, they will already have a saleable raw material which, after the fourth year would be enhanced by the collection and sale of the seeds. There is a tremendous market for the large branches for use as timber. All these factors could have a significant effect on enhancing the livelihood of rural people.

Given the favourable government support in the development of this promising industry, we as citizens must seize the opportunity and invest on it. In the 1980's and 1990's, India produced and exported neem oil, generating well over USD2billion a year.

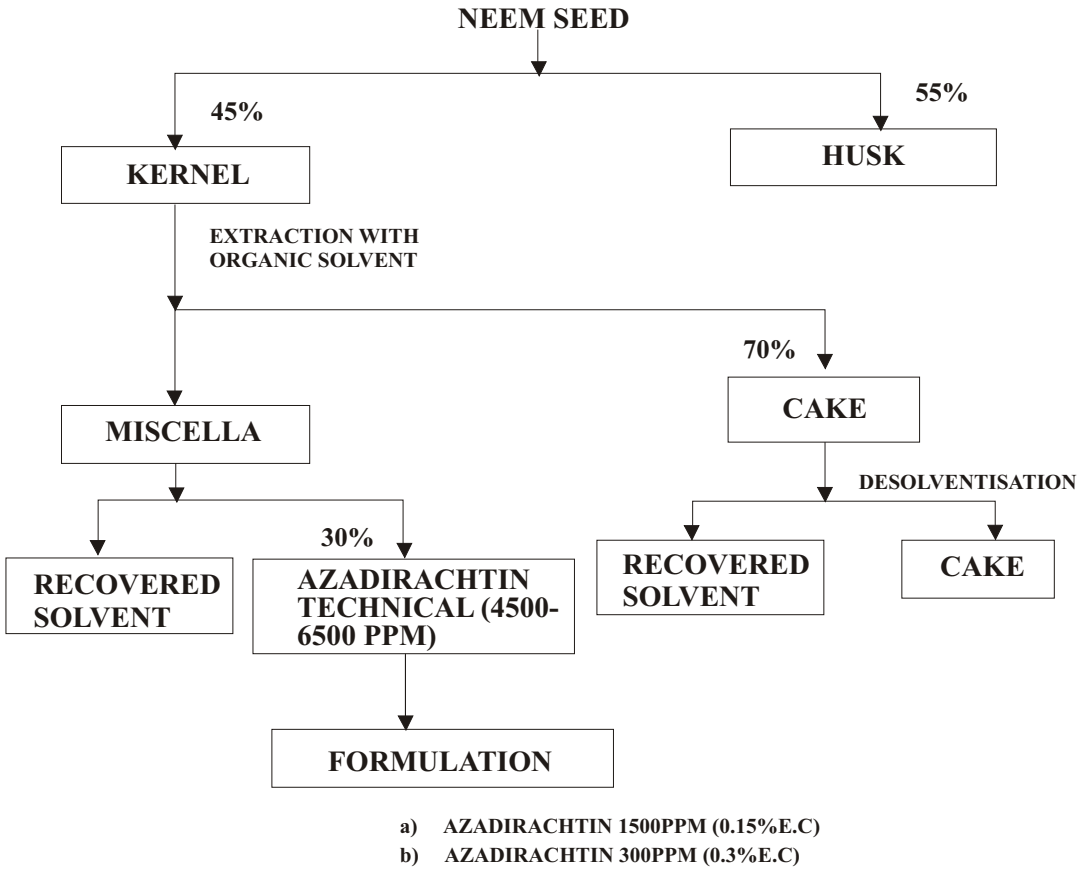

Fig. 1. Process Flow Chart for Azadirachtin
Source: NARICT* Project Report
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"EMPLOYMENT CREATION AND OPPORTUNITIES IN THE MANUFACTURING SUB-SECTOR: THE CASE FOR THE MANUFACTURING OF COTTON, TEXTILE IN NIGERIA".

BY
DR. GODDY NKEM ONUOHA*

Dr. Goddy Nkem Onuoha

PREAMBLE

Nigeria is the third largest producer of cotton in Africa after Egypt and Sudan. Cotton growing zones are mainly in the Northern parts of the country, though the planting of cotton started in Western Nigeria. Like the palm oil tree, cotton is another agricultural product that is completely utilizable as will be evident soon. When cotton is harvested, the yield includes the stalk and the ball. Both in fashion and the accompanying fad, it is the ball that is considered useful. The stalk is generally burnt or otherwise disposed of in a manner to suggest that it is an undesirable by-product of the harvest and utilization of cotton. Recently, it has been demonstrated that the stalk is a useful source of raw material for the manufacture of medium density fiber board (MDF).It is also cheaper than other popular raw materials that are used for the manufacture of MDF. These include hardwood and softwood mill waste (chips, sawdust, planer shavings, plywood and veneer trim). The ball is processed in a ginnery where the seed is separated from the ball to obtain lint which is baled and serves as the raw material for the cotton textile industry. The seed is processed and the kernel separated from the husk; which is useful as cattle feed. The kernel is then processed to yield cottonseed oil and linters. Linters are used for padding in furniture and automobiles. They are also used in the manufacture of cellulose products such as rayon and lacquers. After oil is extracted from the kernel, cake is the residue, which is very rich in protein. The cake is deployed, as feed for animals while its by-product "foots", is fatty acid used for industrial products. The process diagram below indicates the diverse and divers uses of the cotton plant.

The textile mill and products industry comprise establishments that produce yarn, thread and fabric and also a wide variety of textile products for use by individuals and businesses but not including apparels. The process of converting raw fibers into finished non-apparel textile products is complex. Textile mills take natural and synthetic fibers, transform them into yarn, threads or webbing. To produce spun yarn, natural fibers must first be processed to remove impurities and give products the desired texture and durability as well as other characteristics. After the initial cleaning stage the fibers are spun into yarn. Fabric and textiles are produced by means of weaving, knitting and tufting. In weaving mills, looms are used to transform yarns into cloth. Looms weave or interlace two yarns, so they cross each other at right angles to form fabric. Modern looms are complex automated machinery. At anytime during the production process, a number of processes called finishing may be performed on the fabric. These processes include dyeing, bleaching and washing among others. Finishing encompasses chemical or mechanical treatment performed on yarns or fabric to improve appearance, texture or performance.

A complete textile manufacturing facility or industry is like a limousine. There can only be more expensive ones. By their nature, there are no cheap limousines. A specialized mill is more approximate to a sedan. It is more affordable than a limousine. A textile manufacturing industry is an assemblage of machines, materials and men. Such a factory is capable of processing several different

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raw materials including vegetable, animal and synthetic fibers but in the discourse below attention is focused on cotton as the raw material. It is necessary to indicate at once that the target market for the industry in question is both domestic and foreign. Therefore product quality is expected to be high. This can be achieved by incorporating open-end or turbine spinning, which combines drawing, roving, lapping and spinning into one operation.

1. THE MANUFACTURE OF COTTON, TEXTILE IN NIGERIA

There are about 132 textile mills in Nigeria most of which employ less than a hundred workers. Annual domestic manufacture of cotton textiles is about 376 million square meters. The average price of cotton as at 1995 was N40,972:00 per Tonne. The output of the spinning/weaving industry in 1995 was N1.014 Trillion, with industrial costs of N0.345 Trillion yielding a value added of N0.67 Trillion. Cost factors include raw cotton, wages and salaries, dyestuff and chemicals. The emphasis in the textile industry has continued to shift from mass production to flexible manufacturing. So some mills should aim at supplying customized markets. In view of this, in future if not immediately, effort should be made to create incentives that will make it attractive for entrepreneurs to invest in specialized operations such as spinning or weaving only but feed the mills that could concentrate on printing and finishing. This will increase the value added in the industry.

2. SOURCES OF MATERIAL AVAILABLE

Cotton is grown in three zones of the Northern Nigeria. These are the Northern, Eastern and Southern zones. The Northern zone comprises the former Kano, Sokoto, Katsina, Zaria and Plateau provinces. The Eastern zone includes the Borno, Bauchi, Sardauna and Adamawa provinces while the Southern zone comprises Kabba, Benue, Southern Niger and Southern Illorin provinces. The annual average output of cotton in Nigeria between 1990 and 1995 averaged 189,000Tonnes. The internal consumption of cotton within this period was about 400,000 bales or 72,560Tonnes per annum. The weaving capacity in Nigeria exceeds the spinning capacity with the result that many textile mills engaged in weaving depend of imported yarns. The cost of importation of textile yarn thread exceeds N0.164 Trillion annually. At the same time, about one third or 63,000Tonnes of the locally produced cotton is exported. Therefore there is the need to add value to the raw cotton by increasing the spinning capacity in the cotton textile mills. In the domestic textile manufacturing industry, the cost of raw material ranges between 50 - 70 percent of the cost of the product. The value added during processing of the raw cotton to yarn is about 50 percent. So if spinning capacity is increased enough for the raw cotton that is presently exported to be processed locally, the added value to the economy will be a minimum of N1.29 Trillion. This will have a salubrious effect on both the textile industry and he Nigerian economy. Employment generation will increase and the excess quantity of the yarn thus manufactured could be exported to earn further revenue. On the basis of the foregoing, while considering the cotton textile manufacturing industry, the temptation is to incline positively to the expansion of the spinning arm of the industry in order to take advantage of the available raw materials. Howbeit, the proposal hereafter outlined spans the entire processes of spinning, weaving and finishing.

3. THE EQUIPMENT REQUIRED

We will discuss the equipment necessary for setting up a cotton textile manufacturing industry from the point of view of the processes or necessary operations rather than that of individual items of machinery. It is expedient that we do this because of the flexibility in the equipment requirement for this industry. The kind and quality of the finished products desired influence the variation in the machinery employed. The necessary operations required to convert raw cotton to finished textile products include opening, blending, carding, combing, roving, spinning, weaving, dyeing, printing, finishing and packaging. The equipment required includes the following:

Textile
1.Complete blow room machines
2. Carding machine
3. Combing machine
4. Open-End spinning machine

Preparation
1. Warping machine
2. Singeing machine

Weaving
1. Weaving machine (Fluid Jet Loom)

Dyeing
1. Dry dyeing machine
2. Steam/padding machine

Printing
1. Complete printing machine

Finishing

Quality Control
Complete Laboratory

In order to make meaning of this manufacturing plant, we shall specify the desired production range as Ne 5 to Ne 30 where the target capacity is restricted to Ne 16 or 7.5Tonnnes per day. For this purpose, we may now be more specific with the equipment specifications.

Blow room
1 automatic bale opener, 10m length, 1 multi-mixer with 6 compartments, 1 opener and beating point, 1 fine opener

Carding
8 carding machines with flock feeder with can changer

Drawing
2 draw frames, double head type (first passage)
2 draw frames, double head type with auto leveler (second passage)

Combing
2 lap formers, 7 combing machines with auto can doffing, 1 automatic lap transport system.

Roving
8 roving frames with automatic doffer and overhead cleaner linked to 13 winding machines

Spinning
4 open-end spinning machines with waxing device

Weaving
10 no. Ultra High Speed Water Jet Looms

Dyeing
1 Soft Flow Jet Dyeing Machine

Printing
1 Rotary type printing machine with eight color capability

Washing
1 continuous-washing-machine (perforated drum washing machine), with perforated drums and squeezers, including closed scouring sections; fabric feeding delivery; and effluent heat exchangers suitable for pre-washing of raw fabric, light weaving fabrics as well as post-washing and post-bleaching of fabric

Finishing
1 finishing machine, oil-fired, fully computerized, complete with controller and heat recovery unit

4. MANPOWER

The manpower is distributed under different departments. These are Management, Administration, Maintenance, Production, Professional, Material Handling, Sales and Services and Utilities. They range from managers to casual laborers. The various job descriptions include but are not limited to industrial machinery mechanics, general maintenance and repair workers, maintenance workers-machinery, front-line supervisors. Printing machine operators, textile machine setters, operators and tenders, bleaching/dyeing machine operators, cutting machine setters operators and tenders, winding machine setters, operators and tenders, helpers for production workers, laborers and freight, stock and material movers, packers and packagers and office clerks.

Production

Production workers, which include front-line managers and supervisors spend most of their sift time on the production floor. They account for about 60% of the total staff.

Machine setters

This is the largest group. They thread yarn through guide needles or rollers

Extruding machine operators

They load chemicals or pulp into machines and adjust the controls for proper tension, speed and heat.

Installation, Maintenance and Repair
This group inspects the machines to make sure they

are working properly and also carry out the necessary repair operations. They constitute about 2% of the workforce.

Engineers and Technicians

They account for about 1 % of the workers. These are drawn the ranks of Textile, Mechanical and Industrial engineers.

Skilled products operators
These include quality control inspectors who use precision measuring instruments and complex testing equipment to detect product defect, wear or deviations from specification

5. THE LAND SPACE REQUIRED

The land space required s about thirty six hectares. This allows for installation of further trains when expansion is desired in the future.

7. PROFITABILITY OF THE BUSINESS

The value added in a gross output of about sixty small textile mills with a gross output of N1.014 Trillion is N0.670 Trillion. This means that the business is profitable. On the face value, the cost of setting up a textilemanufacturing is high. But it had been made clear that it is simpler, cheaper and more profitable to set up a small high quality yarn spinning industry.

This approximates the sedan mentioned earlier on and is more suitable to one aspiring to become an entrepreneur.

6. THE CAPITAL OUTLAY

Project cost

Item Cost *(Naira)*	*N : K*
Land p/s	8,460,000:00
Land development p/s	1,200,000:00
60Tonne Weighbridge p/s	4,230,000:00
Buildings *(Administration, Logistics, Marketing, Production, etc)*	32,890,000:00
Water supply *(City mains, borehole, structural steel tank, treatment facility)*	4,200,000:00
Public power supply *(11 KV power line extension to premises 250 KVA transformer)*	3,890,000:00
Private power supply *(Two unit 250KVA generators, Control panel,Fuel storage tank)*	10,200,000:00
Machinery & Equipment	1,050,000,000:00
Transport *(Fork Lift, Trucks, Vehicles)*	135,000,000:00
Maintenance equipment and tools	12,000,000:00
Installation & Commissioning	27,800,000:00
Insurance	8,300,000:00
Clearing, Transportation and Handling	12,000,000:00
Engineering Fees	51,300,000:00
General Contingency	103,000,000:00
TOTAL	**1,413,170,000:00**
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INVESTMENT IN SOAP PRODUCTION

BY

DR. O. OLATUNJI*

Dr. O. Olatunji

INTRODUCTION

Soap is a popular washing and cleansing product. It is commonly used for hygienic purposes especially in the cleaning of both domestic and industrial materials. Soap is an indispensable product in day-to-day living which has made its demand compulsory and constantly high in homes and industrial environments. Hence, this emphasizes its importance to the human community in particular.

Soap production business is in the group of industrial ventures that could easily be operated on a small scale to boost the country's economic development. The relatively low capital outlay, when compared with other production ventures, simplicity of production technology and its enormous usefulness has endeared the project to prospective investors. Currently, established soap businesses have contributed to the entrepreneurial capabilities of Nigerians, enhanced income generation, reduced unemployment and upgraded living standard (Koleoso, 1990).

The present democratic government, in its efforts to encourage local production has prohibited the importation of soap products. Also, soap production business is one of the major projects proposed for sponsorship through the skill acquisition scheme of the Federal Government's National Poverty Eradication Programme. Other current relevant policies put in place by the government include: the establishment of Nigerian Bank of Industry (BOI) charged to make loanable funds available to the industrial sector and the Small and Medium Industries Equity Investment Scheme (SMIEIS). These are to ensure that Nigerians reap greater dividends of democracy through industrial development.

THE PRODUCT

Soap, a metallic salt of high molecular fatty acids, is obtained from the chemical reaction of fats and oils with caustic alkalis called Saponification (Nwosah, 1986).

In the past, Soap was produced by traditional methods. Though crude, the resultant product serves the same purpose as modern soap. Unlike the traditional methods which use unrefined palm oil and ash, the modern methods use refined fats and oils, caustic alkalis (for better finishing) and additives such as dye and perfume, which are added to improve the appearance and odour of the soap.

Soap can be broadly classified based on the uses to which it is to be put, hence, we have toilet and laundry soap. This implies there are soaps specifically for washing / laundry purposes while some others are for bathing / toilet purposes. The toilet soaps can be further grouped into ordinary toilet soap, medicated and black soaps. Unlike detergents which are in powder and liquid forms and are produced from petro-chemical products, soap is produced from natural fats and oils and are generally in solid form. These characteristics of soap make it possible for it to be used in cleaning the skin and for other purposes for which detergents are unsuitable.

It is important to note that the technology of soap production varies from one class to another. For example, toilet soaps are produced with more ingredients suitable for skin care and have attractive shapes, colours and packaging. Consumers appreciate their worth in spite of their higher prices compared with laundry soaps. On the

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other hand, laundry soap is relatively easier to produce, needs little finishing and has cheap and simple packaging.

MARKET INFORMATION

Generally, of all the consumables commonly purchased for use, soap occupies a prime position since it is put into uses in everyday activities. A normal daily routine starts by taking a bath with soap, putting on clothes washed with soap, going to places of work or businesses where one use or the other would be found for soap. Soap is used in homes, schools, hospitals, hotels, offices, industrial set-ups, e.t.c.

There are strong and obvious indications that a large domestic market for soap exists within the country. The country's teeming population, estimated at 120 million, lends credence to this facts. A past survey revealed that the average family of 8 members uses four and two tablets of soap for washing and bathing per week, respectively. This gives an estimated yearly national demand of 3,120 million tablets of laundry soaps and 1,560 million tablets of toilet soaps (Adeyemo, 2002).

In the early 80's, soap was majorly supplied into the Nigerian market by the multinationals such as PZ, Lever Brothers, etc. which produce brands like 'Lux', 'Canoe', 'Key soap', 'Premier'; and detergents such as 'Elephant', 'Omo', 'Tempo', e.t.c. Aside from the multinationals there are currently various local producers and suppliers of both laundry and toilet soaps all over the country. Hence, the presence of 'ST', 'Okin', 'Happy day', e.t.c. of laundry soaps and 'Mojees', 'Enkalon', 'BBB' etc. of toilet soaps in the market (Oyeku and Kupoluyi, 2001). This results largely from the breakthrough recorded by the Federal Institute of Industrial Research, Oshodi (FIIRO) in the formulation of laundry and toilet soaps and development of machinery for them. The technology has been transferred to numerous Nigerians till date. Between 1986 and 1999, 830 prospective investors had acquired the technology from the Institute (Kupoluyi, et. al. 2004)

. The recent ban on soap importation into the country is to curtail the flooding of the market with imported brands such as 'Medisoft', 'Movet' 'Glitze', all from Indonesia and 'Narce' from England, etc. (Oyeku and Kupoluyi, 2001). Before this ban, 14,726,028 tonnes of soaps (toilet and laundry) were imported into the country in year 2000 alone, at a staggering value of =N=1,358,692,860 from countries such as Chad, Benin, Ghana, Jordan, Japan, Thailand, United Kingdom, United States, Italy, China, Spain, e.t.c. (FOS, 2001). The importation of soap into the country shows a supply-demand gap which could be filled by new entrants into the business, while the ban on importation of the product would ensure the survival of local industries. Prevalent colours among toilet soaps are brown, pink, purple, green and white for some imported ones, while blue and green colours are very common among locally produced brands. The laundry soaps are generally green and yellow in colour. The shapes take various forms such as ovals, round, rectangular for toilet soaps, while laundry is generally rectangular. Toilet soap brands have sizes ranging from small (90-100g), medium (120-140g) to big (200-250g) (Oyeku and Kupoluyi, 2001).

Usually, toilet soaps are attractively packaged, especially multinational and imported brands, while the packaging employed by local producers are generally of lower quality than the former.

Export potential for soaps is very high, as the ECOWAS sub-region serves as a ready market for locally produced soaps. Hence, indigenous entrepreneurs are hereby encouraged to invest in soap production both for the domestic market and to earn foreign exchange.

The immediate outlets for soap (toilet and laundry) in the domestic market are major markets in towns and cities, supermarkets, departmental stores, schools, laundry houses, industries, catering centers, e.t.c.

RAW MATERIALS FOR SOAP MAKING

The raw materials for soap making are common and are generally available on the shelves in chemical stores. The principal raw materials are: saponification oils, caustic soda, soda ash, sodium silicate, sodium sulphate, colourants, perfumes and some other additives, depending on the type of soap to be produced and also on the

method to be used, either cold or hot process.

The Oil

Both vegetable oils (e.g. Palm Kernel Oil [PKO], Palm Oil, Coconut Oil) and animal oils (e.g. Lard, Tallow, etc.) are used in soap making. Good laundry and toilet soaps can be made from vegetable oils, but in some cases especially for toilet soap, a mixture of both vegetable and animal oils are used to obtain soap of better quality. In Nigeria, the most common oil used in soap making is PKO, which is produced locally but large quantities are still being imported to compliment local production (Table 1).

An oil with good taste and odour is considered good for soap making rather than a rancid oil with unpleasant odour. Rancidity is a chemical reaction that takes place when the oil is over-exposed to atmospheric oxygen (air) due to long storage. It is an oxidation reaction that leads to reduction in the fatty acid content of the oil, thereby leading to incomplete reaction between the oil and the caustic soda. Due to insufficient fatty acid, the soap produced from rancid oil retains unreacted caustic soda, making the soap unfriendly to the skin and even fabrics. A good oil must be free of unpleasant odour, water and dirt. Some chemical tests useful in determining the quality of oil for soap making include: free fatty acid or acid value test, saponification value, peroxide value and iodine value. Palm Kernel Oil is available for instance at Real Vegetable Oil Limited, Ojota, Lagos and many other oil mills across the country.

Caustic Soda

Caustic soda is the common trade name for Sodium Hydroxide (NaOH). It is an important raw material for soap making. Currently, the local demand for caustic soda is met through importation, as there is no local production (Table 1). Caustic soda must be added in the right proportion in accordance with the soap formulation, as excess or insufficient quantity mars the quality of the soap produced. Excess quantity leaves unreacted caustic soda on the soap, while insufficient quantity leaves excess oil on the soap, thereby reducing the foaming ability of the soap.

Soda Ash

Soda Ash, otherwise called "Washing Soda," is a common foam booster used in soap making. Although commercial production of Soda Ash has not started in Nigeria, a great potential exists for its local production from "Trona" a mineral deposit found in large quantities especially in Borno State. Both dense and light soda ash could be used in soap production depending on the type of soap to be produced. Insufficient soda ash in soap production produces soap of little foam, while excess of it will make soap brittle and harsh on the skin and fabrics. A quick test to determine good soda ash is to dissolve it in water. A good one dissolves slowly, while the bad one dissolves instantly. Local demand for soda ash is met through importation (Table 1).

Sodium Silicate

Sodium Silicate is also called "Water Glass". When used in soap making, it functions as a hardener and cleanser. Sodium Silicate is produced locally from silica sand and soda ash. The local production is complemented by importation (Table 1). Sodium Silicate can be obtained in both solid and liquid forms, but the latter form is commonly used for soap making. A good Sodium Silicate is transparent to bluish in colour, has a biting sour taste, sticky to touch, dissolves unreadily in cold water, but dries fast within minutes when the solution is dropped on the floor. Excess sodium silicate makes the soap brittle, soft and harsh.

Sodium Sulphate

Sodium Sulphate also functions as a hardener in soap making. It helps to absorb excess water in the soap. Sodium Sulphate is not produced locally, as such it is imported. It also improves soap appearance, making it to shine. Some local soap makers use table sugar instead of Sodium Sulphate to achieve the same effect. Excess Sodium Sulphate will also make soap brittle, soft and harsh.

Perfumes

Perfumes are added to soap to give it good odour. Perfumes with long lasting odour, which are rather expensive, are normally used for toilet soaps, while cheap perfumes are used for laundry soaps. Common perfumes used for soap making found in the markets are: citronella,

lavendar, lemon, rose, jasmine, avon, H&R, etc. These are imported and are readily available in chemical stores.

Colourants

Colours are improvers which enhance the appearance of the end product. Various colours such as: blue, brown, green, white, yellow and red are added to soaps depending on the type of soap produced. Colourants are imported and are available in chemical stores and the open market.

Others

Many other materials can be added to soaps mainly as fillers and extenders. The function of fillers and extenders is to increase output, there-by bringing down the cost of production. For any material to qualify as soap filler and extender, it must be chemically inert i.e. it must not react chemically during the course of production, it must be cheap and readily available and must be easy to apply or use. Common examples of soap fillers and extenders are Kaolin, CMC (Carboxymethyl Cellulose), clay, starch, and recently introduced is "garri" . It should be noted that for production of high quality soap, fillers and extenders might not be necessary. Fillers and extenders cannot be used for cold process, but rather for semi-hot or hot processes.

Water

The water to be used in soap production must be chemically and microbiologically clean. Chemical impurities in water could affect soap quality, while some bacteria that survive during soap reaction can be harmful to human body. Physical impurities like clay could impart colour on the soap, thereby marring the desired colour.

Table 1:Importation Figures for Soap Raw Materials

Raw Materials	Year	Quantity (Tonnes)	Value N'000
P K O	2000	44.40	2,435.00
	2001	30.84	2,633.46
	2002	313.34	7,066.01
	2003	12.23	12,054.61
Caustic Soda	2000	147,607.85	2,425,290.34
	2001	1,326.69	108.48
	2002	46,749.98	2,513,684.67
Sodium Silicate	2000	325.76	8,008.00
	2001	3,595.32	126,696.19
	2002	1,893.95	126,106.02
	2003	12,777.39	251,240.52
Soda Ash	2000	61.80	751.00
	2001	14,642.18	759,694.59
	2002	17,473.64	832,998.10
	2003	221,468.05	948,594.90

SOURCE: FOS Trade Summary.

STANDARD ORGANIZATION OF NIGERIA'S (SON) REGULATIONS FOR SOAP

Laundry Soap

The standards for soaps are set by SON. According to SON laundry soap shall be well made, stabilized, uniformly mixed and thoroughly saponified using soda or a mixture of soda and potash, prepared from suitable fats and oils. It shall be white or coloured, compressed in bars or cakes and shall have good lathering and cleaning properties. The following are SON's general requirements for laundry soap (excluding built and filled soap):

i. Hard laundry soap shall be in bars or cake form.

ii. It shall be free from objectionable odour both as received and in water solution.

iii. It shall not have active chlorine or oxygen.

iv. It shall not contain any visible foreign matter.

v. It shall possess good lathering and cleansing properties.

vi. It shall have no injurious effect on the skin.

vii. It shall comply with the specifications on Table 2

Toilet Soap

According to SON, toilet soap shall be of a high grade, well made, uniformly mixed, stabilized and thoroughly saponified using soda or a mixture of soda and potash prepared from suitable fats and oils. It shall be white or coloured, perfumed and or cakes and shall have good lathering and cleaning properties. The following are SON's general requirements for laundry soap (excluding built and filled soap): compressed in cake form and shall possess good lathering properties. The general requirements for toilet soap are:

(i) Toilet soap shall be in cake form.

(ii) The soap shall be free from objectionable odour both as received and in water solution.

(iii) It shall not contain any visible foreign matter.

(iv) It shall not break on drying after immersion for one hour at 23°-30°C in distilled water. It shall have good lathering and cleansing properties.

(v) It shall have no injurious effect on skin.

(vi) It shall have no injuries effect on skin.

(vii) The soap shall conform to the requirements of Table3 when stored under normal storage condition for period of six months.

Table 2: Specifications for Laundry Soap

Characteristics	Requirements (% by Wt.)
Total Fatty Acid	62 min.
Rosin acid of TFM	3 max
Unsaponified Matter	0.2 max
Matter insoluble in water	0.5 max
Free Caustic Alkali	0.1 max
Chlorides as NaCl	1.o max
Matter insoluble in ethanol	1.0 max
Total Free Alkali as Na_2O	0.25 max

The laundry soap shall confirm to the requirement above when stored under normal storage condition for a period of six months

Table 3:Specifications for Toilet Soap

Characteristics	Requirements
Total Fatty Acid	76.5 min
Matter Insoluble in ethanol	2.0 min
Free Caustic Alkalis as Na_2O	0.05 max
Chlorides as NaCl	0.75 max
Unsaponified matter	0.50 max
Rosin Acid of TFM	3.00 max
Total Free Alkali content as Na_2O	0.20 max

PRODUCTION PROCESS

FIIRO has developed a simple cold process technology for Soap production. The basic unit operations involved in this process are summarised below:-

1. Weighing
The raw materials are weighed as required

2. Preparation of solutions
Caustic Soda and other solutions are prepared as required

3. Saponification
The soap forming reaction takes place in a reactor by appropriate and timely mixing of the raw materials and soap "off Cut" (if necessary/available).

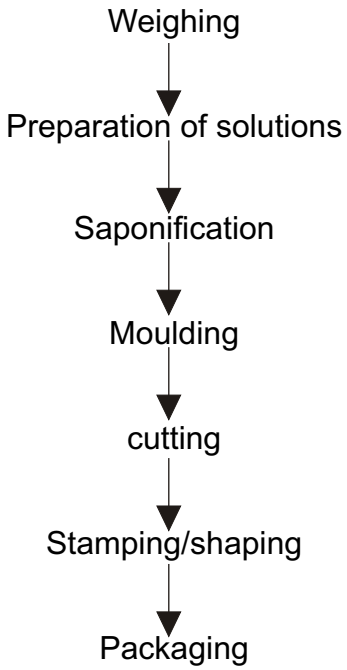
4. Moulding
The molten soap from the reactor is poured into moulds and allowed to solidify.

5. Cutting
The mould soap is cut into bars and tablets as desired.

6. Stamping/Shaping
The soap bars or tablets are stamped as required.

7. Packaging
The soap is properly packaged and packed ready for sale.

The process flow chart is shown below:-



MACHINERY AND EQUIPMENT REQUIREMENT

The machinery and equipment required are locally available. They are simple and can be fabricated at FIIRO on request. The list of items and the costs is presented on Table 4:

PROPOSED PRODUCTION PROGRAMME

Production Days / Week: *5*

Production Weeks/Annum: *50*

Production Days / Annum: *250*

Production Volume /Day: *15,000 Tabs*

Production Volume / Annum: *3,750,000Tablets*

Table 4. List of Machineries and equipments for Soap Production

MACHINERY AND EQUIPMENT	SPECIFICATION	COST (# 000)
Industrial type Motorised soap reactor	500 Litres stainless steel	300.00
Special shape motorised soap cutting machine	Stainless steel	260.00
Special shape motorised (toilet) Soap stamping machine	1200 Tablets/ hour Stainless steel	375.00
Laundry soap motorised stamping machine	1200 Tablets/hour Mild steel	170.00
Laundry soap motorised cutting machine	500kg/Hr Mild Steel	170.00
Soap Plodder	500 kg/hour	450.00
Packaging machine		75.00
Others (including metal moulds and accessories)		50.00
TOTAL		1,850.00

MANPOWER REQUIREMENT

The project requires the services of both skilled and unskilled labour. For the capacity recommended, the following labour force is required: one Production Manager, six Production Assistants, twelve Factory Operators, two Marketing Assistants, one Account Clerk, one Administrative Assistant, one Cashier, one Secretary/ Typist and two Security men. The production crew takes charge of administrative and accounting functions of the project. The marketing personnel are strictly in-charge of the product marketing.

SPACE REQUIREMENT

About 10m x 20m space is required for the project. This will accommodate production/ factory facilities, storage (Raw materials and finished products) facilities and sales/administrative office.

ESTIMATED TOTAL CAPITAL REQUIREMENT

A. Pre-Production Expenses

Item	Cost N 000
Company registration	15.00
Training/Technical Assistance	15.00
Trial Production	56.78
NAFDAC Registration	70.00
TOTAL:	156.78

B. ESTIMATED FIXED CAPITAL COSTS

Item		Cost N 000
Land and Building		1,250.00
Machinery and Equipment		2,035.00
(Including 10% Installation)		
Distribution Van (Fairly used Pick-up Van)		450.00
Generator (12.5 KVA)		220.00
Office furniture and equipment		75.00
TOTAL	=	4,030.00

C. Estimated Working Capital

Item	Coverage Period	Cost N 000
A. Current Asset:		2,588.19
I. Account Receivable		
II. Inventory		
Raw materials stock	1 week	263.62
Supplies	1 month	249.94
Utilities	1 month	39.10
Finished Product	1 week	400.38
Stock		
Cash in Hand	1 week	71.89
B. Current Liabilities		
Accounts Payable	1 week	1,387.45
C. Working Capital (A - B)		1,200.75

TOTAL INVESTMENT COST

ITEM		COST N'000
Pre-Production Expenses		156.78
Estimated Fixed Capital Cost		4,030.00
Estimated Working Capital Cost		1,200.74
TOTAL	=	5,387.52

PROFITABILITY

Total sales (1.8m tablets of toilet soap at N25 and 1.2m of laundry soap at N8.00)	45,000,000.00
Total Production Cost	36,957,070.00
Gross Profit	8,042,930.00
Corporate Tax @ 30%	2,412,879.00
Net Profit	5,630,051.00

SERVICES AVAILABLE AT FIIRO

- Training on Soap production process
- Soap machinery and Equipment Fabrication
- Preparation of detailed feasibility report
- Quality control and Product analysis

These services are available under our Technical Assistance Services (including machine and equipment installation, Commissioning and personnel training on installed machines and equipment).

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Employment Creation and Opportunities in the Manufacturing sub-sector. The Case for the Production of Corn Flakes.
Dr. Abubakar