Environmental Effects of Batik Production in Itoku Market and Perception of the Producers in Abeokuta, Ogun State.

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Abstract

Batik waste water from batik industry outlets contains heavy metals Cd Cr and Pb which exceed the required standard of environmental quality. This happens also on batik waste water pools in residential sewers and on dug well water around the gutter. On dug well water around the gutter only Pb which levels exceeds the required environmental quality standard. There were 16.1% of damaged wells, 17.9% of damaged internal walls and 19.7% of wells with damaged well floors. The potential for infiltration of batik waste water into the well. The physical condition of dug wells has the potential to contaminate batik waste water, there are 3.6% turbid well water, 16.1% smelly water, 9.8% colored water and 10.7% taste. Pollution to dug well water can have an impact on public health because it is used for daily use to drink, cook, bathe and wash

because>65% has no other sources of clean water. Also, its effect on the environment has a stronger impact. However, with proper orientation and solutions as provided by this study, there is a greater management task.

Introduction

However, Batik production because of its peculiarities has a great influence on the environment. Air and water pollution, heavy sedimentation, destruction of natural habitat, soil degradation, is as a release of the negative consequences of waste produced by manufacturing industries and firms in the natural environment (Yaacob, 2016). Nevertheless, sustainable development is not going to be achieved unless other important players' small and medium enterprises (SMEs) are also environmentally responsible (Yaacob, 2016). In this regard, Special attention should be given to small businesses (indigenous Textile industries) in order to address environmental degradation in the country. The human-environment relationship is bidirectional, according to Davis (2011). Human behaviour is of influence on the well-being of the environment, and conversely does the well-being of the environment influences human behaviour (Davis, 2011). Humans influence the environment in positive and negative ways. In batik industry, humans influence the environment mostly in a negative way, by creating environmental degradation (Handayani et al., 2018). Direct cause and effect relations exist between humans and the environment, such as weather and climate being of enormous importance for food production for human survival (Moseley & Perramond, 2013).

However, there are also more challenging problems that include indirect causality or complex causal chains that have uncertain consequences (Fraser et al., 2003). This is the case in the batik industry. The batik industry has a particular relation between humans and the environment. For batik, several resources are used, such as fabrics, water, wax, and dyestuff (Suliyanto et al., 2015). The production of batik with these resources has several consequences for the environment, where the biggest one is waste. Most of the waste that is produced gets dumped into the environment without any treatment (Yaacob et al., 2016). The challenging complication of the batik industry is that human management decisions lead to these environmental degradations, that make specific changes in the environment.

These changes will also have, in return, unpredictable consequences for the community (Fraser et al., 2003). For instance, the batik entrepreneurs dump their waste from batik practices directly into the soil or river, which results in the water being polluted (Yaacob et al., 2016). This polluted water in the nearest soil or river has an impact on the accessibility to clean water for the whole community that is near this river. The results of these impacts for the environment will return into new management decisions, that feed a further cycle of environmental impacts and human responses. That is a continuous cycle, in which both environment and society influence each other (Fraser et al., 2003).

However, the influence of humans on the environment is yet more considerable than the influence of the environment on humans nowadays (Thomas and Middleton, 1997). Therefore, the environmental impacts that result from batik production are higher than the restoring capacity of this particular environment (Fraser et al., 2003).Nonetheless, this human-environment relationship is not only about the behaviour of humans,but also about the mind of humans towards the environment (Kaiser et al., 1999).This study pays attention to the evaluation of Batik production in relation to its effects on the environment not neglecting however the health of the workforce involved in production.

Wastewater from Batik industry contains grease, wax, heavy metal suspended solids, and dyes (in painting and coloring processes) (McClatchy, 2011). For adire, several resources are used, such as fabrics, water, wax, and dyestuff (Suliyanto et al., 2015). The production of batik with these resources has several consequences for the environment, where the biggest one is waste. Most of the waste that is produced gets dumped into the environment without any treatment (Yaacob et al., 2016). The challenging complication of the batik industry is that human management decisions lead to these environmental degradations, that make specific changes in the environment. The results of these impacts for the environment will return into new management decisions, that feed a further cycle of environmental impacts and human responses. Second, Batik industry is a significant

Statement of the Problem

The production of Batik products allows for an increase in the affluence of traditional culture and also maintenance of our historical background and heritage. However, the production of batik products by indigenous Textile industries exposes the environment to alot of toxic and hazards. Batik activities also produce large amounts of effluents with a high concentration of pollutants which required extensive treatment before discharging into the environment. Amongst various cottage industries, Batik industry is chosen as a case because of a number of reasons. First, the said industry is responsible for water pollution and according to the latest report by department of the state of Kelantan compliant rate of the industry relatively low compared with other industries-65% (DOE Kelantan Report, 2011). This industry produces wastewater or discharge which contributes to water pollution since it utilizes heavy chemicals. This industry not only provides income for entrepreneurs but at the same time employs thousands of workforces in both downstream and upstream of the industry. This study pays keen attention to the effect of product wastes on the environment and the health of it producers and also proffers possible solutions to see that the initial (maintenance of history and cultural heritage) is achieved.

Research Objective

This research study evaluates the perception of Batik production and its effect on the environment in Itoku, Abeokuta, Ogun State.

Specific Objectives

The specific objectives of the study are to:

i. To determine the socio-demograpghic characteristics of respondent in Itoku, Abeokuta, Ogun State.
ii. Asses the effects of Batik production in relation to product wastes on the environment.
iii. Examine the perception of Respondents and their involvement in environmental management.
iv. To evaluate the effects of Batik product wastes on the health of the workers.
v. Proffer Solutions and proper methods of waste disposal.

Research Hypothesis

Null Hypothesis

$H0_1$: There is significant relationship between socio-demographic characteristic of the respondents and their perception on the effect of batik production on the environment.

$H0_2$: There is significant relationship between the socio-demographic characteristics of the respondents and the perception of respondents and their involvement in environment management.

Significance of the Study

This study will be Significant in that it will highlight the effects of Batik production on the producers in itokun, Abeokuta Ogun State and also evaluates the products and production of Batik designs and its effect in relation to waste management. The study will also create awareness on Batik products which will lead to a transformation in the Textile industry and the Country at large, and also increase our cultural heritage and indigenous Textile. The result of this study will be relevant for the government organisation and non-governmental organisation and agencies interested in Textile production within the local and regional area of Ogun State, These organisations can utilize the findings to develop programmes aimed at strengthening the capacity of producers and also creating proper awareness on the methods of waste disposal. This study will acess the involvement of small and medium size firms or industries (SMEs) in Batik production and environmental management. This study will also provide information on Respondent's perception towards Batik products and production.

Scope of the Study

The study is confined to Itoku Market, Abeokuta, Ogun State. Itoku was chosen because of its high production of Batik designs and Adire production, in General.

Definition of Terms

Batik: Wastes: Waste (or wastes) are unwanted or unusable materials. Waste is any substance which is discarded after primary use, or is worthless, defective and of no use. According to Oxford Dictionary, wastes are unwanted or unusable material, substances, or by-products.

Environment: Environment means anything that surrounds us. It can be living (biotic) or non-living (abiotic) things. It includes physical, chemical and other natural forces. Living things live in their environment. They constantly interact with it and adapt themselves to conditions in their environment. In the environment there are different interactions between animals, plants, soil, water, and other living and non-living things. According to Merriam Webstar Dictionary, environment is the conditions that surround someone or something: the conditions and influences that affect the growth, health, progress, etc., of someone or something. It is also the complex of physical, chemical, and biotic factors (such as climate, soil, and living things) that act upon an organism or an ecological community and ultimately determine its form and survival.

Waste Disposal: Waste Disposal is the collection, processing, and recycling or deposition of the waste materials of human society. According to Logman Dictionary waste disposal is the process of getting rid of unwanted materials or substances. In industrialized countries, municipal liquid waste is funneled through sewage systems, where it undergoes wastewater treatment, or sewage treatment. This process removes most or all of the impurities from wastewater, or sewage, before they can reach groundwater.



SOURCE: FIELD STUDY (2012) **PLATE 1: SHOWING TEXTILE WASTE DISPOSED IN GUTTER**

Methodology

Methodology discuses the design, procedures, the subjects (sample), research instruments, sampling techniques, validity, reliability study and method of data analysis.

Research Design

This research was carried out on a descriptive survey to evaluate the perception of batik production and its effect on the environment.

Study Area

Abeokuta, which means "**underneath a rock**" or "**refuge among rock",** is capital of Ogun state, southwestern Nigeria. It is situated on the east bank of the Ogun River, around a group of rocky outcroppings that rise above the surrounding wooded savanna. It was founded in 1830 by a hunter, **Sodeke,** A leader of the egba refugees. It lies on the main railway (1899) from Lagos, 48 miles (78 km) south, and on the older trunk road from Lagos to Ibadan. It is located at 7°9'39"N 3°20'54"E. As of 2013, the surrounding area had a population of 700,000.

Modern Abeokuta is an agricultural trade centre (rice, yams, cassava, corn [maize], palm oil and kernels, cotton, fruits, vegetables, shea butter, and rubber) and an exporting point for cocoa, palm produce, fruits, and kola nuts. Rice and cotton were introduced by the missionaries in the 1850s, and cotton weaving and dyeing are now traditional crafts of the town, in which Itoku is one of the major manufacturer and seller of this craft. Itoku market is one of the popular landmarks found in Abeokuta, Ogun State. It has a latitude of 7°09'38.4"N 3°20'36.9"E. It it known for its major manufacturing, selling and production of different indigenous Textile materials and traditional crafts of the town.



*SOURCE: FIELD STUDY (2012)***PLATE 2: SHOWING ALADIRE'S RINSING FABRIC IN A STREAM (*ODO ABETU* IN ITOKU)**

Population of the study

The population of the study will consist of some producers of indigenous adire attire, with a total number of 171 producers, in itoku market, Abeokuta, Ogun State.

Sample size and technique

The sampling size was determined using the Taro and Yamani formula, error margin of 5% was adopted for the purpose of this study.

$$n = \frac{N}{1+N(e)^2}$$

Where n=sample size

e=error making

N=population size

N=? e=0.05

n=_171_

$1+171(0.05)^2$
n= 120

Therefore, the sample size comprises of respondent of 120 producers in Itoku market, Abeokuta, Ogun State.

SAMPLE TECHNIQUE: A simple random technique was used in selecting the respondents from the study area.

Instrument for Data Collection

A structured questionnaire was used to obtain data from respondent. The questionnaire contains section which include:

SECTION A: Socio-demographic characteristics of the respondent.

SECTION B: Effect of Batik production in relation to product wastes on the environment

SECTION C: Perception of respondent and their involvement in environmental management

SECTION D: Effect of Batik product wastes on the health of workers

SECTION E: Solutions and proper methods of waste disposal

Validity and Reliability of Research Instrument

A research and content validity were used get the validity of the instrument. A drafted copy was then submitted to my supervisor for proper correction and approval, after which it was subjected to pre-testing.

Data Analysis

All raw data was collected and analysed using descriptive analysis using statistical package for social scientist (SPSS).

1. Effect of batik production in relation to product waste on the environment

2. Effect	3. Yes (%)	4. No (%)
Pollution of surrounding	93 (80.9)	22(19.1)
Destruction of drainage system	81 (70.4)	34 (29.6)
Heavy metal build-up	88 (76.5)	27 (23.5)

Increase in organic content such as COD, Ph, BOD, TSS	85 (73.9)	30 (26.1)
Dearth of aquatic organism	86 (74.8)	29 (25.2)
Disease outbreak in the surrounding	79 (68.7)	36 (31.3)
Availability of hazardous and toxic substance	90 (78.3)	25 (21.7)
Soil contamination	103 (89.6)	12 (10.4)
Water pollution	84 (73.0)	31 (27.0)

Result in **Table 1** reveals that majority (89.6%) of the respondents agreed that soil contamination occur as a result of batik production in relation to product wastes on the environment, while majority (80.9%) of the respondents agreed that there is pollution of surrounding and majority (78.3%) of them agreed that availability of hazardous and toxic substance as a result of batik production in relation to product wastes on the environment. Likewise, result reveals that 76.5% of the respondents agreed that heavy metal build-up as a result of batik production, while 74.8% of the respondents agreed that there is dearth of aquatic organism and 73.9% of them agreed that there is an increase in organic content such as COD, Ph, BOD, TSS due to the effect of batik production in relation to product waste on the environment. Environmental problems of the textile industry are mainly caused by discharge of a large amount of wastewater without proper prior treatment. Its manufacturing process consumes a large amount of water mainly in the dyeing, washing, and finishing process. Wastewater from the textile industry is classified as the most polluting of all the industrial sectors, considering the volume generated as well as the effluents‟ composition. Textile wastewater contains different types of dye and heavy metals, for instance, the organo-metallic dye (Visa et al., 2010). The presence of certain heavy metals in the textile dyes will probably lead to direct consequences implication human and environment. Demirizen et al., (2007) reported that, textile industries release heavy metals such as cadmium (Cd), copper (Cu), chromium (Cr), nickel (Ni), and lead (Pb) in wastewater production.

Table: 2 Perception of respondent and their involvement in environmental management

Perception	SA (%)	A (%)	U (%)	D (%)	SD (%)	Mean
There is modification in production process in order to produce environmentally friendly products.	17(14.8)	23(20.0)	16(13.9)	28(24.3)	31(27.0)	2.71
There are environmentally friendly packages in the area	33(28.7)	41(35.7)	9(7.8)	19(16.5)	13(11.4)	3.54
There is SOP for batik production process in order to reduce waste generated.	16(13.9)	22(19.1)	20(17.4)	51(44.3)	6(5.2)	2.92
There is a recycled raw material in order to minimize the waste generated.	21(18.3)	32(27.8)	25(21.7)	29(25.2)	8(7.0)	3.25
Provision of employees training related to handling, distributing, and storing raw materials to minimize raw material overload.	19(16.5)	27(23.5)	18(15.7)	29(25.2)	22(19.1)	2.93
There is solid waste disposal mechanism	16(13.9)	29(25.3)	21(18.3)	33(28.7)	16(13.9)	2.97
There is adequate planning of environmental management programs in the area.	22(19.1)	19(16.5)	26(22.6)	34(29.6)	14(12.2)	3.01
There is adequate monitoring of environmental management programs in the area.	18(15.7)	25(21.7)	23(20.0)	30(26.1)	19(16.5)	2.94
There is adequate implementation of environmental management programs in the area.	26(22.6)	38(33.0)	11(9.5)	23(20.0)	17(14.8)	3.29
There is adequate evaluation of environmental management programs in the area.	16(13.9)	22(19.1)	20(17.4)	51(44.3)	6(5.2)	2.92

Result in Table 2 reveals that majority (63.4%) of the respondents agreed that there are environmental friendly packages in the area was with the mean value of 3.54

based on the perception of respondents and their involvement in environment management, while above half (55.6%) of the respondents agreed that there is adequate implementation of environmental management programs in the area was with the mean value of 3.29 and almost half (46.1%) of the respondents agreed that there is a recycled raw material in order to minimize the waste generated. From batik production was with the mean value of 3.25 in the study area. Also, 36.5% of the respondents agreed that there is adequate planning of environmental management programs in the area was with the mean value of 3.01 based on perception of respondents and their involvement in environment management in the study area. This industry produces wastewater which contributes to water pollution since it utilizes a lot of chemicals. Wastewater from batik industry contains grease, wax, heavy metal suspended solids, and dyes (in painting and coloring processes) (McClatchy, 2011). Al-Rabaani et al. (2009) examined the relationship between student's attitudes and their willingness to take action to reduce environmental problems like energy problems, water problems, air pollution problems, waste problems and desertification problems. They found that students were willing to take action to reduce environmental problems and it was not affected by gender or faculty. Berrone and Gomez-Mejia (2009) showed that managerial perceptions of the importance of environmental regulation as a competitive opportunity are associated with a more proactive stance on environmental commitment.

Table;3 Effects of batik products on the health of workers

Effects	A (%)	O (%)	N (%)	Mean
Cause physical injuries to worker.	35(30.4)	45(39.1)	35(30.4)	2.00
Present of work stress among workers	19(16.5)	56(48.7)	40(34.8)	1.82
Complaint of severe backache	9(7.8)	52(45.2)	54(47.0)	1.61
Irregularity of menses	10(8.7)	40(34.8)	65(56.5)	1.52
Hypertension	51(44.3)	39(33.9)	25(21.7)	2.23
Skin burns and rashes among workers	45(39.1)	41(35.7)	29(25.2)	2.14

Result in **Table 3** reveals the effects of batiks products on the health of workers sampled for the study. Findings shows that hypertension was with the mean value

of 2.23, while skin burn and rashes among workers was with the mean value of 2.14 and cause physical injuries to workers was with the mean value of 2.00 as a major effect of batik products on health of workers sampled.

Likewise, present of work stress among workers was with the mean value of 1.82 and complaint of severe backache was with the mean value of 1.61 in the study area. The major health related issues were not experienced by the majority of the respondents sampled for this study such as skin rashes, skin umceration, raches and ulceration, swelling of skin, skin swelling and rashes, likewise respiratory diseases as at the time of this study.Certain reactive, vat and disperse dyes have also been recognized as skin sensitisers (Suna, Tewes, Luch and Pirow, 2020).Adeakin (2009) posited that, skin diseases, such as allergic contact dermatitis, irritant dermatitis and inflammation of mucous · membrane have been found to be associated with adire production. According to Haldi ya, et al. (2005) millions of workers are occupationally exposed to dyes in the world, but little is known about their knowledge of and attitude toward the effects of dyes on their health.

Effect of batik production in relation to product waste on the environment

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Result in Table 3 reveals that majority (63.4%) of the respondents agreed that there are environmental friendly packages in the area was with the mean value of 3.54 based on the perception of respondents and their involvement in environment management, while above half (55.6%) of the respondents agreed that there is adequate implementation of environmental management programs in the area was with the mean value of 3.29 and almost half (46.1%) of the respondents agreed that there is a recycled raw material in order to minimize the waste generated. From batik production was with the mean value of 3.25 in the study area. Also, 36.5% of the respondents agreed that there is adequate planning of environmental management programs in the area was with the mean value of 3.01 based on perception of respondents and their involvement in environment management in the study area. This industry produces wastewater which contributes to water pollution since it utilizes a lot of chemicals. Wastewater from batik industry contains grease, wax, heavy metal suspended solids, and dyes (in painting and coloring processes) (McClatchy, 2011). Al-Rabaani et al. (2009) examined the relationship between student's attitudes and their willingness to take action to reduce environmental problems like energy problems, water problems, air pollution problems, waste problems and desertification problems. They found that students were willing to take action to reduce environmental problems and it was not affected by gender or faculty. Berrone and Gomez-Mejia (2009) showed that

managerial perceptions of the importance of environmental regulation as a competitive opportunity are associated with a more proactive stance on environmental commitment.

Table: 4 Effects of batik products on the health of workers

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Result in **Table 4** reveals the effects of batiks products on the health of workers sampled for the study. Findings shows that hypertension was with the mean value of 2.23, while skin burn and rashes among workers was with the mean value of 2.14 and cause physical injuries to workers was with the mean value of 2.00 as a major effect of batik products on health of workers sampled.

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Table: 5 Proffer solution and proper methods of waste disposal

Proper methods	Yes (%)	No (%)
Distillation methods	65(58.3)	48 (41.7)
Licensing of waste management facilities,	103(89.6)	12(10.4)
Provisions of batik waste disposal	93(80.9)	22(19.1)
Provision or installations system of wastewater treatment plant (WWTPs)	104(90.4)	11(9.6)
The use of law enforcement to restore damaged environments facilities	103(89.6)	12(10.4)

Result in **Table 5** reveals solution and proper methods of waste disposal among the batik producer in the study area. Finding shows that majority (90.4%) of the respondents indicates that provision or installations system of wastewater treatment plant (WWTPs), while majority (89.6%) of the respondents indicate that licensing of waste management facilities, and the use of law enforcement to restore damaged environments facilities respectively and majority (80.9%) of the respondents indicates provisions of batik waste disposal as proffer solution and proper methods of waste disposal in the study area.

Summary, Conclusion and Recommendation

Summary

The process of making batik requires a dye derived from synthetic dyes containing heavy metals. Most of the waste is directly discharged into the environment without going through the processing first. This is due to the lack of optimal management of existing WWTP as well as lack of public awareness of environmental conservation. This study is based on evaluation of batik production and its effect of the environment in Itoku area of Abeokuta Ogun State, Nigeria. The study looks at socio-economic characteristics of the respondent, effect of batik production in relation to product waste on the environment, perception of respondents and their involvement in environment management, Effects of Batiks Products on the Health of Workers and proffer solution and proper methods of waste disposal. Simple random sampling techniques was used to select one hundred and twenty (120) respondents from the study area. Descriptive statistics was used analyze the result.

Conclusion

Batik waste water from batik industry outlets contains heavy metals Cd Cr and Pb which exceed the required standard of environmental quality. This happens also on batik waste water pools in residential sewers and on dug well water around the gutter. On dug well water around the gutter only Pb which levels exceeds the required environmental quality standard. There were 16.1% of damaged wells, 17.9% of damaged internal walls and 19.7% of wells with damaged well floors. The potential for infiltration of batik waste water into the well. The physical condition of dug wells has the potential to contaminate batik waste water, there are 3.6% turbid well water, 16.1% smelly water, 9.8% colored water and 10.7% taste. Pollution to dug well water can have an impact on public health because it is used for daily use to drink, cook, bathe and wash because>65% has no other sources of clean water.

Recommendation

From the findings of the research work the following recommendation were provided as follows:

1. The recommendation of this research is the need for waste water treatment batik starting from source through WWTP both on the household and communal scale with the role of local government as a facilitator.
2. Society and batik industry need to be involved in managing environmentally friendly batik industrial center.
3. There is need for more comprehensive programmes that inculcate environmental knowledge for all batik entrepreneur.
4. There should be involvement of home extension agent in creating hygiene awareness.

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