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# Socio-Economic Analysis of Healing Forest Soils and Rocks in Ogun and Ondo States, Nigeria

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## ABSTRACT

Forest soils and rocks are natural resources that serve as source of antibiotic that enhance human health. Multistage sampling technique with four stage design was adopted,11 L.G.A were purposively selected 6 in Ogun and 5 in Ondo States. Data collection was through the use of questionnaire and interview guide. A total of 151 respondents (72 in Ogun and 79 in Ondo States) were selected cutting across Herbalists, Herb sellers and Farmers. Data collected include socio-economic characteristic, income and types of healing forest soils and rocks. The results revealed that the mean age of respondents was 54years, 58.2%, had primary education. Mean monthly income of respondents was ₦147,544. Logit result shows marital status and mode of training were positive and significant at 5% and 1% respectively. Chi- square showed significant association between male and female users (p<0.05). The Gini – Index (GI) of the respondents was 0.06, which implied that healing forest soils and rocks reduces income inequality. It was concluded that healing forest soils and rocks contribute to the welfare of respondent and  recommended that Forest policy should encourage practitioners improve on processing, and collection of healing forest soils and rocks through fiscal measures and incentives to encourage production.

**Keyword:** *Socio economic characteristic, healing forest soils and rocks, human health*

## INTRODUCTION

Soil is the major source of antibiotic and other natural medicine that enhances human health. For instance, nearly 80% of antibacterial agent approved between 1983 and 1994 originated from the soil and about 40% of prescribe drugs have their origin in the soil, and about 60% of all newly approved drugs between 1989 to 1995 originated from the soil [1].  Although some synthetic antibiotics, usually chemically related to natural antibiotics, have recently been produced, the source of most antibiotics is the soil environment [2; 3; 4; 5]

The healing practices of ancient cultures, as well as of modern society, have depended on forest clay minerals to treat a variety of topical and internal maladies, and natural clays with adsorptive and absorptive properties have been exploited in cosmetics and pharmaceuticals. Traditionally, clay is mixed with water to form a gel or paste that can be applied externally for cosmetic purposes or skin protection [6].The healing practices of ancient cultures, as well as of modern society, have depended on clay minerals to treat a variety of topical and internal maladies, and natural clays with adsorptive and absorptive properties have been exploited in cosmetics and pharmaceuticals. Traditionally, clay is mixed with water to form a gel or paste that can be applied externally for cosmetic purposes or skin protection [6]. Clays also cleanse and refresh the skin and aid in the healing of blemishes, ford digestive and gastrointestinal maladies that cause borborygmi the stomach rumblings caused by gas moving through the intestine is the attractive power of clay-particle surfaces [7]. The deliberate consumption of earth for medicinal or spiritual healing is term Geophagy, which is a practice that provides a direct connection between human health and Earth's rocks and minerals. Intermediaries in the food chain are eliminated, thus providing direct access to potentially beneficial or harmful elements and compounds associated with the ingested materials. Many colloquial expressions and scientific terms are used for edible clay,

including beidellitic montmorillonite, chalk; clay dirt, white dirt, clay tablets, colloidal minerals, and white mud [8]. Kaolin is a clay-like material and rocks that are rich in kaolin-ite are known as china clay. In its natural state kaolin is a white, soft powder consisting principally of mineral crys-talline flakes, not colloidal material, with melting point: 1725–1790$^0$C [9]. Kaolin is insoluble in water, mineral acids and solutions of alkali hydroxides. It is one of the principal intestinal adsor-bents which has traditional utilization for internal treatment of various enteric disorders, colitis, enteritis, dysentery and diarrhea associated with food and alkaloidal poisoning [10; 11; 12]. It binds to and traps bacteria and their toxins and gases in the gut. It also binds to water in the gut, which helps to make the stools firmer, hence giving symptomatic relief [7].

## MATERIAS AND METHODS

The study was conducted on healing forest soils and rocks. Ogun State and Ondo State were selected for this study.

**Source of data collection**

For the purpose of this study, the research data were obtained from primary source with the aid of well structure questionnaire. Respondents cut across herbs sellers, herbal practitioners and knowledgeable members of the society. Secondary data was also used for the study from previous literature.

**Sampling size and sampling procedure**

A multistage sampling technique was used for this study. Two States was selected which are Ondo and Ogun. Multistage Sampling involved the division of Ondo and Ogun States into two strata to represent the primary selection units. From each unit, locations were purposively selected due to the areas noted for the use of healing forest soils and rocks in the area. Ondo State comprises of 17 Local Government Areas (LGAs) while Ogun State comprises of 20 local government areas. In Ogun state 6 local Government were selected which are, Segamu, Ijebu-East, Ado-

odo, Yewa-South, Ewekoro, Ifo,. In Ondo State 5 local Government were selected which are Okitipupa, Ile-Oluji, Ese-Odo, Odigbo, Irele, while 6 Local government areas were selected. The third stage was the purposive selection of 3 communities from the local Government selected in the two State, Segamu (Oja awolowo, Oja oba ,Sabo,) Ijebu- East (Ijebu mushin, Igan, isoyin) Ado- Odo (Iyanalogbo, Oke- osa, Tigbo) Ifo ( Ifo market, Bungalow)) and from Ondo these community were selected Okitipupa (Idepe, Ayinka, Ikoya ) Ile-luju (Igbola, Mayisada, Odemarin ) Ese odo (Igbobini, Igala,kribo ) Odigbo (Fajola, Oja bale, Ore) Irele (Ajegbe, Loda,Ome ). The fourth stage involved the selection of respondent from each of the communities.

## PROCEDURE FOR DATA ANALYSIS

### Descriptive statistics

Descriptive statistics like frequencies Mean and percentage were used to summarize the socio-economic variables. Inferential statistic such as logit and chi-square were used to identify factors influencing profitability as well as gender variation in utilization within the study areas, Economics tool of Gini-index was used to determine inequality among the respondents Logit regression was also used to determine factor that influence the profitability of the respondents

**Logit regression:** Logistic regression is used to describe data and to explain the relationship between one dependent binary variable and one or more nominal, ordinal, interval or ratio-level independent variables. This model was used in explaining the socioeconomic factors influencing the profitability level of the respondents:

$$Y = Ln\left[\frac{P}{1-P}\right] = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \cdots\cdots \beta_k X_k + U_i$$

Where

Y= Dependent Variable (Profit, Mean and above =1, otherwise 0)
Independent variables:

$X_1.$ Age (Number of Years)
$X_2,$ Gender (Male =1, otherwise 0)
$X_3,$ Marital status (Married =1, otherwise 0)
$X_4,$ Family Type (Monogamy =1, otherwise 0)
$X_5,$ Religion (Christianity =1, otherwise 0)
$X_6,$ Educational status (No formal education =1, otherwise 0)
$X_7,$ Occupation (Tradomedical practitioner =1, otherwise 0)
$X_8,$ Mode of Training (Inheritance =1, otherwise 0)
$X_9,$ Years of Experience (Number of Years)
$\beta_1.\beta_k$ = Regression coefficient or estimation.
$U_i$ Error term

**Chi –square:** The Chi –square was used to determine the gender variation in the uses of healing forest soils and rocks.

$$X^2 = \frac{(O - E)^2}{2}$$

Where **O** is the observed frequency in each category
E is the Expected frequency
df freedom (n-1)
$X^2$ is Chi-square

**Gini Index (GI):** Gini index is standard economic measure of income inequality of income distribution. It was calculated based on the covariance terms as described by Lorenzo Govanni Bellu in policy support service, Values of '0' signify total equality and value of '1' expresses maximal inequality.
The Gini index (G) equation:

$$G = \sum_{k=1}^{m} \frac{2}{y} COV[Y\kappa_1, F\{y\}]$$

$$COV = \Sigma XY = (X - \bar{X})(Y - \bar{Y})\bar{7}N$$

Where G = Gini index
M = total number of income sources
K = an income source
Y = income

## RESULTS

**Table 1: Socio economic characteristic of the respondents in Ogun and Ondo States**

| Variable | Frequency | Percentages | Mode | Mean |
|---|---|---|---|---|
| **Age** | | | | |
| ≤39 | 2 | 1.3 | 51 | 53 |
| 40-50 | 65 | 43 | | |
| 51-60 | 50 | 33 | | |
| 61-70 | 28 | 18.5 | | |
| ≥70 | 6 | 4 | | |
| Total | 151 | 100 | | |
| **Gender** | | | | |
| Male | 97 | 64 | Male | |
| Female | 54 | 36 | | |
| Total | 151 | 100 | | |
| **Marital Status** | | | | |
| Single | 1 | 0.7 | | |
| Married | 117 | 77.5 | Married | |
| Divorced | 22 | 14.6 | | |
| Widow | 10 | 6.6 | | |
| Widower | 1 | 0.7 | | |
| Total | 151 | 100 | | |
| **Education** | | | | |
| No formal education | 42 | 27.8 | | |

| | | | | |
|---|---|---|---|---|
| Primary | 88 | 58.2 | Primary | |
| Secondary | 20 | 13.2 | | |
| Tertiary | 1 | 0.6 | | |
| Total | 151 | 100 | | |
| **Religion** | | | | |
| Christianity | 55 | 36.4 | | |
| Islam | 79 | 52.3 | Islam | |
| Traditional | 17 | 11.2 | | |
| **Total** | 151 | 100 | | |
| Family Type | | | | |
| Monogamy | 69 | 47 | | |
| Polygamy | 82 | 53 | Polygamy | |
| Total | 151 | 100 | | |
| **Mode of Training** | | | | |
| Education | 6 | 4 | | |
| Inheritance | 88 | 58.3 | Inheritance | |
| Apprenticeship | 57 | 37.7 | | |
| Total | 151 | 100 | | |
| **Occupation** | | | | |
| Traditional practitioners | 104 | 68.9 | Traditional practitioners | |
| Herb seller | 43 | 28.5 | | |
| Farming | 4 | 2.6 | | |
| Total | 151 | 100 | | |
| **Language** | | | | |
| Yoruba | 129 | 85.4 | Yoruba | |
| Igbo | 1 | 0.6 | | |
| Yoruba and English | 21 | 13.9 | | |
| Total | 151 | 100 | | |
| **Nativity** | | | | |
| Ogun | 68 | 43.7 | | |
| Ondo | 78 | 53.6 | Ondo | |
| Oyo | 4 | 2.6 | | |
| Ijo | 1 | 0.7 | | |
| Total | 151 | 100 | | |
| **Earn income(₦)** | | | | |
| >50000 | 38 | 25.1 | ₦60,000 | ₦147,544.3 |
| 50000 – 99000 | 79 | 52.3 | | |
| 100000 – 149000 | 24 | 15.8 | | |
| 150000 – 199000 | 4 | 2.6 | | |
| <200000 | 6 | 3.9 | | |

Source: Field Survey, 2016

Table 1, Shows the socio economic characteristic of the respondents in Ogun State and Ondo State most of the respondents (43%) are in the age bracket of (40 – 50 years). On gender 64% of all the respondents are Male and 36% female, Larger percent (77.5%) of the population are married while (0.7%, 14.6%, 6.6% 0.7%) are single, divorced widow and widower respectively

On education (27.8%) of the respondents has formal education while 58.3% 13.2% and 0.6% of the respondents has primary, secondary and tertiary education respectively. On religion, the highest percentage of the respondent were Muslim (52.2%) and (36.4%) are Christian while 11.3% of the respondent are neither Christian non Muslim. From the table 1, (53%) of the respondents practice Polygamy and (47%) practice monogamy,

The result also revealed that most of the respondents' uses for the research work were more of traditional practitioners (68.9%) while 28.5% were herb sellers and 2.6% were farmers, larger percentage

(58.3%) of the respondents came into the occupation by inheritance, (37.7% and 4%) came into the occupation by apprenticeship and education respectively, (95.3%, 0.6%, 3.9%) of the respondents speaks Yoruba, Igbo, and Yoruba and English respectively.

From table 1, 25.1% of the respondents earns >₦50,000 annually

on the sales and uses of healing soils, most of the respondents (52.3%) earn between ₦50000 – ₦99000 annually on the uses and sales of healing soils, 15.8% earns₦ 100000 – ₦149000 annually, 2.6% earns ₦150,000 – ₦199000 while 3.9% earn <₦200000 annually on the sales and uses of healing soils

**Table 2: Socio economic factors affecting the profitability of the respondent in the study area (Ogun and Ondo)**

| Variable | Coefficient | t-ratio | Marginal effect |
|---|---|---|---|
| Age | 0.922(1.97) | 1.48 | 0.684 |
| Gender | -0.045 (0.375) | -0.12 | -0.010 |
| Marital status | 0.886(0.414) | 2.14** | 0.196 |
| Family type | 0.188 (0.375) | 0.50 | 0.044 |
| Religion | -0.260 (0.393) | -0.66 | -0.060 |
| Education | -0.339 (0.397) | -0.86 | -0.078 |
| Occupation | 0.163(0.390) | 0.42 | 0.038 |
| Mode of training | 1.00 (0.391) | 2.58*** | 0.234 |
| Year of experience | -2.280 (0.787) | 0.004 | -0.534 |
| Constant | -4.509(0.787) | 0.471 | |

Number of obs   =       151
 LR chi2 (9)   =      24.01
 Prob > chi2   =    0.0043
Log likelihood = -89.455144
 Pseudo R2   =      0.1183

***\*\*\* Coefficient at significant at 1%***
***\*\* Coefficient at significant at 5%***
***\* Coefficient at significant at 10%***
Standard error in parenthesis ()
Source: Field survey, 2016

**Determinants of profitability of the respondent in the study area**

Table 2, showed the result of logit regression of the factors that influence the profitability of the respondents in the study area was presented in table 2, the likelihood value of the model is -37.004. The chi-square (LR Statistic) value of   25.30 was significant at 1% level shows the overall goodness of fit of the model. It confirms that the slope coefficients are significantly different from zero. The result showed that, marital status, and m ode of training have significant influence on the   profitability  of the respondents

**Table 3: Gender variation in soil utilization in Ogun State and Ondo State**

| | O | E | O –E | $(O – E)^2$ | $(O – E)^2$/E |
|---|---|---|---|---|---|
| Male | 113 | 75.5 | 17.5 | 1046.25 | 6.75 |
| Female | 38 | 75.5 | -17.5 | 1406.25 | 6.75 |
| | | | Chi – square | | 37.2 |

Degree of Freedom (df) = n – 1 (2-1) = 1
Chi – square Cal. = 37.2
Chi-square Observed/tabulated/stat (p<0.05) =3.841

Source: Field survey, 2016

**Gender variation in the uses of forest healing soils and rocks**

Table 3, The chi-square analysis on the gender variation on the use of healing soils shows that the test was significantly (p<0.05) different from zero at 5% level of significance and the chi-square calculated was greater than the tabulated

**Table 4: Decomposition of income by income source of the respondent in Ogun and Ondo State**

| **Cumulative income** | 76 |
|---|---|
| Mean | 0.503 |
| **Earn Income** | 1224000 |
| Mean Earn income | 8105.90 |
| Covariance Earn | 259 |
| **Other income** | 6,609,500 |
| Mean | 43771.52 |
| Covariance | 3452.87 |
| **Total Income** | 7833500 |
| Mean income | 51877.48 |
| Covariance | 3711.87 |
| **Gini Earn** | 0.06 |
| **Gini other income** | 0.2 |
| **Gini total** | 0.1 |
| **Decomposition** | 60 |

Source: Field survey 2017

**Decomposition by income source**

Table 4,  reveled the total Gini Index is (0.1) the Gini Index for Earn income is (0.06) while the Gini Index for other income is (0.2), with mean income of ₦8105.96 ₦43771.52 and ₦51877.48. Decomposition by income source has a total value of 60.00% for earn income

From table 5, 11 soils and rocks were identify which has been used effectively in the treatment of diseases such as stomach ache, eyes infection, skin infection, fibroid, dangerous bite and in the cosmetic industry as major raw materials for production.

| S/N | Healing forest soils and rocks | Local name | Description | Uses |
|---|---|---|---|---|
| 1 | Kaolin | Efun | Round and oblong shape | Skin infection, Constipation, Stomach disorder, Ulcer, and Cancer |
| 2 | Sea sand | Iyepe okun | Sandy and whitish | Stomach diseases |
| 3 | Lead(ii)tetreoxosulphate(vi) | Tero | Black, and hard, | Eyes infection |
| 4 | Laterite | Èrò | Rock like, reddish | Skin infection |
| 5 | Rock salt | Obuotoyo | Solid and whitish | Stomach infection |
| 6 | Wasp house | Ile agbon | Brown in colour | Dizziness |
| 7 | Potash | Kaunbala | Grey in colour | Fibroid |
| 8 | Earth worm cast | Idunikolo | Black oblong in shape | Stunted growth in children |
| 9 | Quartz | Ako-okuta | Hard, peach in colour | Strength |
| 10 | Pumice | Okuta ifose | Black with small spore | Cosmetic |
| 11 | Mud | Abata | Reddish in colour | Skin infection, burns and dangerous bite |

Source: Field survey 2016

## DISCUSSION

From table 1, The highest percentage of the respondent were still in their active ages which is in line with Adekambi *et.,al*, [13] which recorded that the mean age of 54 was recorded among the tradomedical practitioners interview in six states of south-west Nigeria, most of the traditional healers were male (64%) and most of the herb sellers were female (34%) this is in line with the findings of Oyalakin [14], in the Yoruba traditional medicine and the challenge of integration.), Ajibesin *et.al.*, [15] who reported that ' traditional medical practice among the Yoruba ethnic group of Nigeria is dominated by the males due to secrecy in practice and transfer of knowledge from generation to generation'

From table 1 majority of the respondents in Ogun and Ondo States (58.3%) came into the occupation by Inheritance (37.7%) by Training, and only (4%) of the respondents came into the occupation by Education This is in line with the findings Erinoso and Ayorinde, [16] who states that great percentage of the respondents in Ogun State, (68%) inherited their knowledge of herbal treatment from their ancestors while 20% got their knowledge from formal training, 10% both from formal training and ancestors while 2% claimed that their trado-medical knowledge was from divination.

This further implies that the respondents may have a household size that will help in healing soils and rock collection and processing.

Moreso, (27.8%) of the respondent in Ogun and Ondo State had no formal education, (58.2%) had primary education (13.2%) had secondary education (0.6%) had tertiary education this result agreed with Omobuwajo *et al.,*[17], which states that traditional medicinal practitioners were people mostly without education, who have rather received knowledge of medicinal plants and their effects on the human body from their forebears. They have a deep and personal involvement in the healing process and protect the therapeutic knowledge by keeping it a secret. The study also showed that Islam as a religion was mostly practice 52.3% of the respondent were Muslim and 36.4% were Christian and 11.3% were neither Muslim nor they were core traditional worshippers. This result is in agreement with the study carried out by Opatola and Kolawole [18] which reported that 65.8% of Herb sellers interview were Muslim by religion

From table 2, Marital status has a positive and significant effect (p<0.05). This could be attributed to the fact that people patronized married respondent in the use of forest healing soils and rocks more, and this will increase their profitability by 0.196 units. Mode of training has positive and significant effect at (p<0.01) on the profitability of the respondents. It inferred that the kind of training the respondent gets also increase the profitability of the respondents by 0.234units

From table 3, it can be inferred that there is association between male and female users of healing soils in the study area since chi - square calculated was greater than tabulated in the two states, therefore the null hypothesis H₀ which states that 'there is no association between male and female users of healing soil' is rejected and the Ha which state that there is association between male and female users of healing soils is accepted for all.

Giving these result in table 4, it could be inferred that 60% of total inequality is explained by earns income among respondent, while the rest 40% is explained by the distribution of other income.

## CONCLUSION

The study reveals that forest healing soil and rocks serve as an orthodox source of medicine Few trado-medical practitioners are knowledgeable about the uses of soils as drug in alternative medicine The result also shows that not all soils are medicinal, Soils used as medicine are mostly in rocks form and require pulverization before utilization. Healing soils and rocks contributed to the welfare of the respondent and therefore reduce income inequality among respondents. Therefore in other to promote the uses of healing forest soils and rock, Forest policy should encourage practitioners to improve on processing, and collection of healing forest soils and rocks through fiscal measures and incentives to encourage production. Further research work should be encourage on healing forest soils and rocks.

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