Evaluating small scale industrial water use in Rukuba Chiefdom of Bassa L.G.A of Plateau State

Ishaku Asukudu Peter

Government Secondary School Bassa, Plateau State, Nigeria
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ABSTRACT

The paradox, that water is not in short supply over the earth as whole (about 70% of the earth surface is water yet it's not news that thus resources which is so relevant to the existence of life is not readily available at the required quantity and quality at all times, in all places. Therefore, the paper explore small scale industrial water use in Rukuba Chiefdom. Through to use of questionnaire. Five small scale industries were studied namely; poultry production, Block-making, Grinding, cooking (restaurant & road side food vendors) and local beer brewing (Burukutu). However, the study revealed that these industries abstract their water from three major sources, Boreholes, hand dug well and streams. It also shows that 4% of the water was use for grinding, 52% was use for making of blocks, 10% was used in poultry production, 28% went into cooking and 6% went into brewing of local beer (Burukutu). The result of the research therefore show a mark variation in terms of sectorial usage and a use of large volume of water in terms of consumption. It also show a shortage of the resource. Therefore, from the above the paper suggests the development of more sources of water to meet the increasing demand.

Key words: *water*
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INTRODUCTION

Among the diverse resources with which mankind has been blessed with water ranks among the most important. According to Clark (1991), water is the most fundamental, substance making life possible on earth. It is the only self controlling resources and its industrial importance cannot be over emphasized.

The major Purpose for which we demand water are house hold (domestic), industrial and agricultural uses Oyebande (1973).

In Africa estimated 88% of all fresh water is use for agriculture, 7% for domestic purpose and 5% for industrial use. Asian water also used mostly for agriculture is at estimated at 86% while 8% is used for industrial purposes and 6% is use for domestic purposes. In Europe, however most of its water use is for industry and stands at 54%, while agriculture and domestic purposes shares 33% and 13% respectively.

Studies have shown that developing countries donate most of their water supplies for agriculture, But Indian for instance use 90% of its fresh water for domestic purposes, 9% for agriculture, and 3% for domestic use (European school books 1994).

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However, small scale industries occupies a place of strategic importance in the economic structure of every country due to it's contribution in times of out put, exports and employment lozi (2000).This is because they provide immediate large scale employment, comparatively high capital ratio, they need lower investment, offer a method of ensuring a more equitable distribution of national income and facilitate an effective mobilization of resources, capital and skill which might other wise remain unutilized.

Macro studies indicates that small scale firms in Africa are evolving leading to a rise in per – capital income. However micro studies indicate that a vast majority of new firms are micro enterprise (less than ten workers) which as per capital income grows appears increasingly in larger localities (Liedholim), (2008). Disappearance rates are highest for micro firms and lowest among larger firms. Death rate are found to be highest during the micro firms initial fours years. If they survive these initial difficult years, prospects typically is brighten, and they are likely to experience a sudden spur of growth that propels them into one of the larger sized categories of micro – enterprise. However relatively few of these firms grow beyond the confines of micro size category and transform themselves, to modern small and medium scale firms.

Small scale industries occupies a pride of place in the Jordanian economy. Development of small scale industries use planned by the government. The government coordinate the development programme through its agencies. Small scale industrial sector account for 50% of the total manufactory sector, has 20%, share in exports and provide 80% of employment in the industrial sector, inspite of all the odds, it has always performed well. Despite the global and domestic recession small scale industries registered a high growth rate when the over all industrial sectors in terms of a number of units.

MATERIALS AND METHODS

In other to achieve the task set in this study; data were collected on the following aspects of small scale industries: water use, sources of water, other uses of water, cost of water, and factor affecting water demand. The information's were obtained through the design and administration of questionnaire. The data used were collected from Rukuba chiefdom of Bassa Local Government Area of Plateau State (Nigeria). Considering the constraint of time and cost as well as other factors that affect the performance of geographic research, the researcher adopted the stratified simple random sampling technique of data collection and took data from Jebu – town and Binchi town respectively. With stratified sample design the effects of certain possible influence can be controlled. Taking a simple random sample for each class or stratum makes the fullest possible use of available information and increases the precision of sample estimate.

Contact (proximal) method was used for collecting data of small scale industrial water use. The contact methods entails the researcher being in direct contact with the source of data. This involves either recording of respondents, responses to questions during interview or issuing of questionnaire which the respondents fill and return to researcher. Hundred questionnaire were administered to the operators of the following five small scale industries: Poultry, Production, Blocks making, Grinding cooking (Restaurant and roadside vendors popularly known as Mama put) and Beer brewing (Burukutu). Twenty five (25) questionnaires were administered to each of these industries.

The major focus of the question were: major sources of water, water use, water demand, cost of water, water shortage water treatment, other uses, and factor affecting water demand.

RESULTS AND DISCUSSION

As Kollar (1976), pointed, that one of the greatest obstacles to long range water resources planning is the lack of the basic data of which to base judgment in regards to allocation of resources. This is especially true of the industrial sector that in so important to economic goal and their development benefits. The use of foreign country data may serve for a time it is no substitute for a country accumulation and analyses of reliable local experience.

However, this paper intends to contribute a little to the data bank on industrial water use. The amount of water required by the various industries was similar for each of the industrial activity for the period under consideration, but differ in terms of the five industrial activities.

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However, 52% of the water was use for block making, 28% was use for cooking (Restaurant and roadside food vendors popularly know as (mama put), 10% was for the production of poultry, 6% was use for the brewing of local beer (Burukutu) and 4% was for grinding. Thus meaning a large proportion of the water used for small scale industries activities went into block making.

Apart from the above usage, a good quantity was use for other industrial activities such as: Washing of hands, washing of machines, food items, washing of plates, and drinking by customer e.t.c. However, 44% of these water used for other purpose was between 51-101 liters, 25% was between 102-152 liters, 14% was between 25-50 liters, while the remaining percentage lied between 204-600+ liters. Thus can be said that 50-100 liters was put into other uses.

The research also indicated problem of water shortages as follows: 40% occurs between Jan – May, 33% - Feb – May, 17% Dec to Jan, 3% - March to April and 2% - March to May.

FACTORS AFFECTING WATER DEMAND
In developing countries, the demand for water are also high in particular sectors. But its development to match there requirement with supply is often lacking so that large rapidly growing cities in particular suffer inadequacies of both quantity and quality of water. Several factors are noted influence a nations industrial use of water e.g. climate, human and economics (Oyebande 1978). The study discovered that under use in the area was been affected by the following factors, Finance (Economics). Distances, diminishing supply (Shortage) 46% of the problem of demand was shortage, 26% was supply and distance, respectively, while 2% was finance.

COST OF WATER PROCUREMENT
Several factors are noted to inference a nations industrial use of water as diminishing supplies increasing demand and stricter pollution control in many cases have substantially increased cost of water, to industries in recent years. This study uncovered that the sum of N318,920 was spend in buying water, in 2000, N3,223,630. Was expended on water, in 2001, N3,487,920 was spend in 2002, and N334,680.00 was also spend on water in 2003 and 3322920 was expended in 2004. Finally N16,566,120.00 was expended for the procurement of water.

TESTING OF HYPOTHESIS
Ho (null hypothesis) = There is no significant variation in the quantity of water use by selected small scale industries in Rukuba Chiefdom
Hi (alternative hypothesis) = There is significant variation in the quantity of water use by small scale industries in Rukuba Chiefdom

Table. 6 Quantity of water use by selected small scale industries in Rukuba Chiefdom

QUANTITY OF WATER USED (Liters)

Year	Poultry	Block	Grinding	Cooking	Beer
2000	978614	51577414	4289604	27881048	6164968
2001	978614	51577414	4289604	27881048	6164968
2002	978614	51577414	4289604	27881048	6164968
2003	978614	51577414	4289604	27881048	6164968
2004	978614	51577414	4289604	27881048	6164968
TOTAL	**48934070**	**257887070**	**21448020**	**139405240**	**30824840**

Table . 4.6.1 Below is water use data for Rukuba Chiefdom, using a factor a factor of 1000. (considering the bulkness of the data).

Year	A	B	C	D	E
2000	979	5178	429	2788	616
2001	979	5178	429	2788	616
2002	979	5178	429	2788	616
2003	979	5178	429	2788	616
2004	979	5178	429	2788	616
TOTAL	**4895**	**25890**	**2145**	**13940**	**3080**

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Step 1: Mean (x) of the entire data
X= 49950/25 = 1998

STEP 2 Total sum of variance

Year	(A-x)	(B – x)	(C – x)	(D-x)	(E-x)
2000	-1019	3180	-1569	790	-1382
2001	-1019	3180	-1569	790	-1382
2002	-1019	3180	-1569	790	-1382
2003	-1019	3180	-1569	790	-1382
2004	-1019	3180	-1569	790	-1382

Year	$(A-x)^2$	$(B – x)^2$	$(C – x)^2$	$(D-x)^2$	$(E-x)^2$
2000	1038361	10112400	2461761	624100	1909924
2001	1038361	10112400	2461761	624100	1909924
2002	1038361	10112400	2461761	624100	1909924
2003	1038361	10112400	2461761	624100	1909924
2004	1038361	10112400	2461761	624100	1909924
TOTAL	5191805	50562000	12308805	3120500	9549620

S^2 = 72939530
STEP 3: BETWEEN VARIANCE

Year	A	B	C	D	E
2000	979	5178	429	2788	616
2001	979	5178	429	2788	616
2002	979	5178	429	2788	616
2003	979	5178	429	2788	616
2004	979	5178	429	2788	616
TOTAL	4895	25890	2145	13940	3080

D

Year	(A-x)	(B – x)	(C – x)	(D-x)	(E-x)
2000	-1019	3180	-1569	790	-1382
2001	-1019	3180	-1569	790	-1382
2002	-1019	3180	-1569	790	-1382
2003	-1019	3180	-1569	790	-1382
2004	-1019	3180	-1569	790	-1382

D^2

Year	$(A-x)^2$	$(B – x)^2$	$(C – x)^2$	$(D-x)^2$	$(E-x)^2$
2000	1038361	10112400	24617861	624100	1909924
2001	1038361	10112400	24617861	624100	1909924
2002	1038361	10112400	24617861	624100	1909924
2003	1038361	10112400	24617861	624100	1909924
2004	1038361	10112400	24617861	624100	1909924
TOTAL	5191805	50562000	12308805	3120500	9549620

S^2 = 72939530
Step. 4 : within variance
= Total sum of variance - Between variance
= 72939530- 72939530=0

STEP. 5 Construction of anova table

Source of variance	Sum of variance	Degree of freedom	Variance ratio
Within group	0	25-5=20	0/20=0
B/W group	72939530	5-1=4	72939530/4=18234883

F- Ratio = larger variance estimate / Smaller variance estimate
= 18234883/0
= 18,234,883.

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Table value at 0.05 = 2.9, and 0.01=4

Decision: for the null hypothesis to be rejected the calculated F must be greater than the table value. Conclusion: Since the calculated F is greater than the table values. We therefore, reject the null hypothesis and accept the alternative hypothesis.

II . Ho (null hypothesis) = There is no significant variation in the quantity of water employed for other uses.
H1 (alternative hypothesis) = There is a significant variation in the quantity of water employed for the uses

Fig 2 – OTHER USES OF WATER

QTY	FREQUENCY	PERCENTAGE
25-50	42	14
51-101	130	44
102-152	76	25
153-203	18	6
204-254	5	1
255-305	12	4
306-356	2	1
357-407	2	2
408-457	0	0
458-508	2	1
509+	6	2
Total	**295**	**100**

FIG 3 FACTORS AFFECTING WATER DEMAND

FACTORS	FREQUENCY	PERCENTAGE
Finance	10	2
Supply	153	26
Distance	147	26
Shortage	262	46
Others	0	0
TOTAL	**572**	**100**

FIG 4 COST OF WATER PROCUREMENT

YEAR	NO OF PLANTS	AMOUNT
2000	11	3187920
2001	14	3223680
2002	12	3487920
2003	14	3343680
2004	12	3322920
TOTAL	**63**	**N16,566,120**

CONCLUSION

Small scale industries occupies a very important part of the economic structure of any country, due to their contribution in terms of output and employment Lozi (2008). But all of these benefit cannot be achieved without adequate investment in the development of water resources. For instance the study, is revealed that block making alone consumed 25,788,707 liters of water just within the period under study thereby buttressing the fact that water, is a major component in industrial production and thus agreeing with Clark (1991) assertion that water is for must fundamental substance making life possible.

REFERENCES

[1] Liedholm .C. (**2008**): The Dynamics of small scale industry in Africa and Role of policy
Http://www.microfinanceway.org/content/article/detaile/1255- with drawn on 29th December, 2008 at 12:28pm)

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[2] Lozi, B.M (**2008**): Journal of social http://www.accessmylibrary.com/com32/summary 0286-34950703 ITm) - with drawn on 29th December, 2008 at 12:05 PM

[3] Mike I.O (**2005**): poverty Reduction in Nigeria; the way forward. http://www.neiti.org.ng/files-pdf/mmsd-Engr Gonisheikh.pdf.29 December 2008 retrieved at 12:45pm

[4] Salami, S.J and Okafor, I.D (**2003**). Surface water quality in an iron ore mining area of itakpe kogi state, Nigeria, journal of environmental science, faculty of environmental science university of Jos .2(1).

[5] www. State. Gov/g/oes/r/s/2007/85333.htm, publication on small industrial water use in Africa.

[6] www.environment.gov.all/water/action/international/oecdworkshop

[7] www.cfr.org/publication11240/water-stress- in sub- saharah Africa 9/06/20080 3:05 pm

[8] www.Unep.org/padelia/publications/volume 2k61

[9] World Book **2001**- The world book encyclopedia volume 21 world Book In c Chicago U.S.A

[10] Young R. (**2000**). On the economic benefits of dams and reservoir projects. Fort Collins, Colarado state University , W.C.D sub miss WBC / MCGraw - Hill.