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Informal Private Sector Participation In Electric Power Supply In Some Areas Of Kano Metropolis

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ABSTRACT: *The paper assesses the socioeconomic and environmental implication of **Maja** as alternative electric power supply strategy in the high density and commercial areas of Kano metropolis. The methods used include: FGD. Interviews, Inventory, and Direct field measurement with the aid of Noise Level Metre, Ambient Air Quality Analyser, GPS, and Thermometer. The result shows that **Maja** has both economic and social impacts as well as environmental repercussion. Respectively, these include: creation of job opportunities, promotion of capital investment and micro economic development, rising of self esteem, provision of social security, noise and air pollution, and soil (land) contamination, among others. It is therefore recommended that in the interim, the **Maja** initiative should be formally inaugurated on franchise basis and adequately supervised by government in order to check careless practices that affect environmental quality. Finally, it has been affirmed that the on-going national electric power privatization exercise should be laid on a sound foundation so as to allow a stable and steady electric power supply in Nigeria in general.*

KEYWORDS: *Informal, Private, Electric Power Supply, Implication*

I. INTRODUCTION

Electric power supply is one of the basic utilities that are very essential to urban metabolic activities. Its efficiency, in terms of constant supply, to large extent grantees the effectiveness and quality of other urban utilities such as municipal water supply, traffic flow, communication, and social security. As a result of this strategic importance, electric power generation and distribution to the public are solely managed or supervised by government. To this effect many nations have since achieved steady electric power supply and some have even fully developed integrated electric power supply systems that allow them to climb the saddle of industrialization and as well possessed a fully developed economy. But in Nigeria as whole and urban centres in particular, the situation is very pathetic; it is more than interrupted power supply but rather a steady non-power supply. In Kano metropolis there exist numerous sections or communities that stay for more than three months without electric power supply even for a second. While those that have electric power supply, they hardly get up to six hours out of 24 hours, not only that, in most cases the electric power current is low and intermittent. In deed, this ugly face of public electric power supply necessitates the well to do individuals to have electric power generators in their residences. On the other hand, the low income group who can not afford the cost of running personal electric power generators resort to patronising informal private electric power suppliers locally known as *Maja* (derived from English word: Merger). The aim of this paper, therefore, is to assess the socioeconomic and environmental implication of *Maja* as alternative electric power supply strategy in the affected areas of Kano metropolis.

II. TREND

Dated back to the 1990s, electric power supply in Kano metropolis was stable both in terms of voltage capacity (current) and duration over time. The phenomenal usage of stand-by electric generators was then very minimal; mainly limited to institutions and factories but quite very rare at individual residences. Interrupted electric power supply then was a localized issue; usually only when there was a major repair or during windy or stormy weather condition. From the early 2000s, however, electric power supply witnessed a fold back in Kano metropolis and in deed, the nation as a whole when one of the biggest power generating plants; Kainji hydro-electric power plant faced some hitches due to failure of some of its installed turbines. As such that ill development, led to reduction in the amount of voltage being supplied to Kano state as a whole. Since then, the usage of electric generators became popular at individual residences and in some commercial premises. Respondents indicated that the year 2006 to 2007 marked the beginning of private sector involvement in electric power supply in commercial areas of Kano metropolis. Then the level of operation was small and the initial rationale centred around individual consumption but later neighbouring shops encourage owners to connect them on condition of assisting them with fueling and servicing the respective electric generators. However, in the year 2010, as the condition of public power supply deteriorated more, the demand for substitute keeps on

increasing. This consequently stimulated the initial operators to change their minds and machines (generating sets) from small capacity 25KVA or less to bigger of 50KVA and 100KVA and began to collect service charges based on individual consumption. A year later in 2011, new more investors emerged on full term with *Maja* as their main business. The successful among them expand the scope of their operations which apart from commercial areas also cover residential areas. Currently, *Maja* enterprises has assumed stand in most high density areas of Kano metropolis as an alternative electric power supply system to the low income group. A respondent described it (*Maja*) as 'a messiah of the masses – with just =N=50 or =N=100 (less than $1 USD) one can have electric power at the time he needs it most'.

III. THE SCENARIO

The mode of operation involves the use of electric generators of different capacity, normally based on demand and the nature of the consumers; residential or commercial area. A field survey of *Maja* service areas shows that in commercial areas different combination of generator sets are used ranging from 20KVA to 100KVA while in the residential areas 100KVA generators are mainly used. Table 1 shows the kinds of electric generators used in *Maja* electric power supply.

Table1: Types of Generators Used in *Maja* Electric Supply

Type of Generators	No.	%	Unit Price (=N=)
Less than 25KVA	9	12.8	=N=210,000
25KVA	14	20.0	=N=250,000
50KVA	21	30.0	=N=1,200,000
100KVA	20	28.6	=N=1,500,000
Over 100 KVA	6	8.6	=N=2,000,000
Total	70	100	-

Source: Fieldwork, 2014

In commercial areas, *Maja* service period normally starts from 10am to 6pm (8hours) and service charges ranges from =N=100 to =N=250 per day based on consumption and fee collection is daily. In residential areas on the other hand, service period is mostly 5 to 6 hours daily; from 6pm to 11 or 12pm, while service charges ranges from =N=50 to =N=150, but mostly =N=100 per day and fee collection is weekly. In both residential and commercial areas fees defaulters are usually being disconnected from *Maja* supply until when settled all the due bills. In terms of connecting individual consumers, however, respondents indicated that in commercial areas individual consumer provides service wire and change-over switch himself, while in residential areas the service operator provides connection wire and individual consumer provides a change-over switch.Generally, the procedure of connecting individual customer involves purchase of registration form from the *Maja* service provider at the cost of =N=500 only, which among other things contains all the conditions of power supply and undertaking by the respective customer. Some of the restricted conditions are: non usage of high voltage demanding electronics such as air-conditions, boilers or heaters, refrigerators, and bulbs; no dual connection (with neighbours or any non registered person); and no sub-letting. Compact fluorescent lamps or improved phosphors are the only lighting system being used.

Although *Maja* operation is an informal arrangement and as well contravene the national policy on electric power supply, interviews with some of the service providers indicated that they seek a verbal permission from community leaders, PHCN (Power Holding Company of Nigeria) staff and police officers before they embarked upon. A cross check interview with some staff of PHCN attests to that and as well added that "since they could not meet the power demand of Kano people, there is no way to term with the *Maja* initiatives, what they only do, is stopping them from using PHCN poles and other installations". As at the period of compiling up this research findings there is no any reported case of conflict or misunderstanding arising from *Maja* service either by the community or government body.

IV. SPATIAL DISTRIBUTION

The areas where *Maja* services are in operation are mainly high density areas of Kano metropolis, which are mostly, not very well planned and mainly occupied by low income groups. The distribution pattern further entails that such areas are agglomerated settlements around the outer rim of the metropolitan area (See Figure1). In addition to that also major commercial areas such as Muhammad Abubakar Rimi (M.A.R) market, Kwari market, Wambai market, and Rimi market, among others are being served with *Maja* alternative electric power. Inventory of *Maja* service areas show that there are total of 70 enterprises involved in *Maja* business in Kano metropolis; 52 in commercial areas and the remaining 18 in residential areas (See Table 2). In depth

interview with some of the service providers reveals three reason for their choice of such places: i. there is unending demand (good market for the service), ii. the generators being used can adequately meet the meager needs of the customers; mostly an individual requires less than 5 florescent lamps, fan and television (in case of residents); and iii. PHCN do not bother much with such areas as they are facing serious difficulties in fee collections. Figure 1 below further portrays the observed spatial distribution of areas under *Maja* service in Kano metropolis.

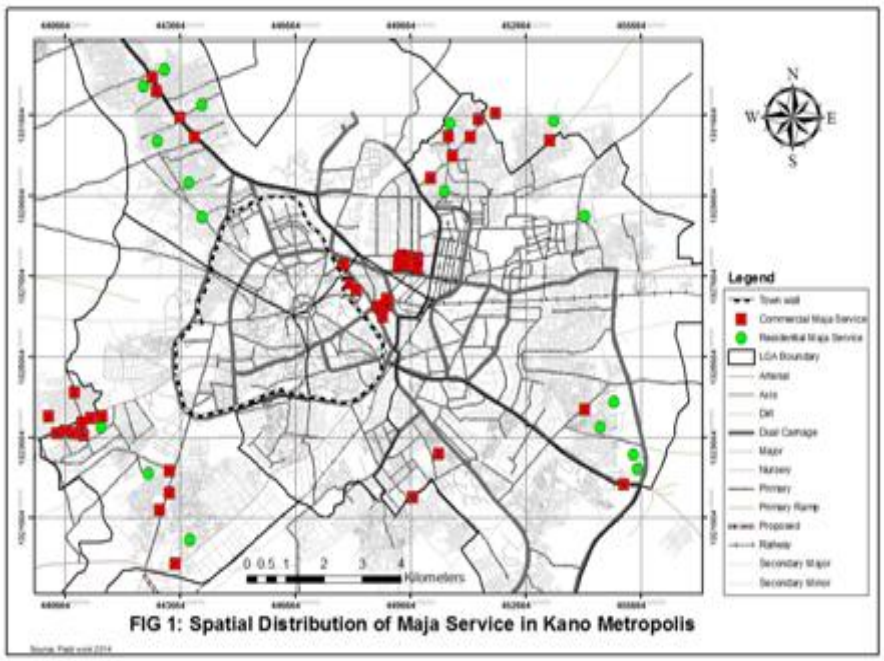

FIG 1: Spatial Distribution of Maja Service in Kano Metropolis

Table 2: Inventory of Areas Patronising *Maja* Services in Kano

Location	No. Maja Generators		Total
	Residential	Commercial	
Abattoir	-	1	1
Brigade	2	5	7
Dakata	1	-	1
Dandinshe	1	-	1
Darayi – 1	1	7	8
Darayi – 2	1	3	4
Gayawa	-	1	1
Gyadigyadi	-	1	1
Gobirawa	1	-	1
Hotoro	2	1	3
Jaen	1	1	2
Kadawa	1	-	1
Kawo	1	1	2
Kurna	2	3	5
Kwari Market	-	4	4
M.A.R. Market	-	16	16
Rijiyar Lemo	2	1	3
Rijiyar Zaki	-	2	2
Rimin Kebe	1	1	2
Sallari	-	1	1
Tsamiyar Boka	1	-	1
Wambai Market	-	3	3
Total	18	52	70
% Total	25.7	74.3	100

Source: Fieldwork, 2014

4.1 Number of Houses on Course

A rapid appraisal based on house counting, billing records and generator's voltage capacity; where bill records are not available shows that in the 14 inventoried high density areas partaking in *Maja* services, a total of 2163 houses are on course. From it, the service proponents generates a gross total of =N=216,300 per day and =N=1,514,100 weekly. On average each service provider covers 154 houses and generates a mean income of =N=15,400 daily and =N=108,100 weekly. Table 3 shows the detail findings.

Table 3: Number of Houses on *Maja* Service

Location	No. of Houses	Expected Return =N=	Actual Daily Turnover	
			Amount =N=	%
Brigade*	324	32,400	24,000	74%
Dakata	162	16,200	14,300	88%
Dandinshe	127	12,700	9,600	80%
Darayi – 1	142	14,200	11,800	75.5%
Darayi – 2	137	13,700	10,000	73%
Gobirawa	156	15,600	11,500	73.7%
Hotoro*	172	17,200	13,700	78.6%
Jaen	108	10,800	7,400	64.8%
Kadawa	87	8,700	7,000	80.5%
Kawo	147	14,700	13,500	91.8%
Kurna*	149	14,900	12,000	80.5%
Rijiyar Lemo*	211	21.100	18,000	85.3%
Rimin Kebe	97	9,700	9,500	97.9%
Tsamiyar Boka	144	14,400	12,000	83.3%
Total	2163	216,300	174,300	-
Average	154	15,400	12,400	80.6%

Source Fieldwork, 2014 * = Two generators

4.2 Number of Shops on Course

In commercial areas, where the *Maja* initiatives began, a total of about 5069 shops are patronising various *Maja* electric power suppliers in their respective areas. The service proponents, in general realised about 96% as turnover from fees collection. Thus, this entails that in the commercial areas of Kano metropolis about =N=681,150 (about $4,007 US) is generated daily from *Maja* electric power supply. Table 4 shows the details of the findings.

Table 4: Number of Shops on Course in Commercial Areas

Location	No. Shops	Expected Return*	Actual Turnover	
			Amount =N=	%
Abattoir	87	13,050	12,650	97
Brigade	231	34,650	33,250	96
Darayi – 1	318	47,700	42,900	90
Darayi – 2	125	18,750	17,200	92
Gayawa	36	5,400	5,400	100
Gyadigyadi	72	10,800	9,700	90
Hotoro	80	12,000	11,300	94
Ja'oji	56	8,400	8,400	100
Kawo	48	7,200	7,200	100
Kurna	211	31,650	31,000	98
Kwari Market	452	67,800	61,000	90
M.A.R. Market	2800	420,000	386,400	92
Rijiyar Lemo	94	14,100	13,700	97
Rijiyar Zaki	85	12,750	12,500	98
Sallari	45	6,750	6,750	100
Sharada	52	7,800	7,800	100
Wambai Market	277	41,550	14,000	96
Total	5069	760,350	681,150	95.9

Source: Fieldwork. 2014 * Based on Average of =N=150 per shop

Table 4 above, shows M.A.R. market leads in terms of number of shops under *Maja* electric power supply and the number of *Maja* generators, followed by Kwari market with 452 shops and 4 generators, and Wambai market with 277 shops and 3 generators. Kawo, Sallari, and Gayawa commercial areas are where *Maja* service is just emerging.

V. SOCIAL IMPLICATION

A Focus Group Discussion with some residents enjoying the services of *Maja* revealed three major social benefits. These are: i) it quenches the ill feeling of social merginalisation; ii) service satisfaction as it allows an individual to plan evening schedules and programme such as night learning, watching television with family, and other productive activities, among others; and iii) it enhances security level of the service area. Respondents also added that the amounts which they spend on kerosene and dry-cell batteries are roughly equivalent to what they are now paying for *Maja* service but the derivable benefits are enormous. Above all, *Maja* service leads to a noticeable improvement in the users' standard of living, through positive impacts that cannot easily be measured in monetary terms. These according to respondents include: reduction of eye strain; elimination of smoke and fire hazards associated with candles and kerosene lamps in homes; there is no danger of children burning themselves if they come in contact with the light source; and relatively reliable and ensures steady supply of electric power.On the side of the service providers also, an in depth interview with two *Maja* entrepreneurs reveals that, they have the feeling of participating in raising the standard of living of people in their community; they are accepted by the users; and in some cases their community members deal with them with high level of respect. This according to the respondents is more than the economic benefits they are deriving from *Maja* enterprises; for it raises their propensity of self actualisation.

VI. ECONOMIC IMPLICATION

Maja electric power supply as economic enterprises requires capital investment and other operational cost. A rapid appraisal aimed at ascertaining the level of capital investment in *Maja* enterprises in Kano metropolis shows that an overall sum of about =N=72.6 million (about $427,000 US) was spent by the respective service providers to procure the inventoried 70 electric generators. In addition to that also the service providers spent an average of =N=28,350 and =N=21,300 weekly as operational cost and wages respectively on each electric generator (See Table 5).

Table 5: Level of Capital Investment and Running Cost in *Maja* Enterprises

Generators	Qt.	Capital Investment =N=	Weekly Spending =N=		Work Force
			Opera.	Wages	
Less than 25KVA	9	1,890,000	47,200	126,000	18
25KVA	14	3,500,000	47,200	196,000	28
50KVA	21	25.200,000	490,000	441,000	63
100KVA	20	30,000,000	980,000	560,000	80
Over 100 KVA	6	12,000,000	420,000	168,000	24
Total	70	72,590,000	1,984,400	1,491,000	213
Average N = 70		1,037,000	28,348.57	21,300	3

Source: Fieldwork, 2014

Table 5 above, clearly portrays the level of capital investment in *Maja* enterprises and as well explains its strength and contribution to the real capital development in the economy of Kano metropolis. Moreover, the employment opportunity created to 213 people generates a total income of about =N=71.6 million per annum which in turns could generates further savings and investment and also improves the living standard of at least the employed persons.

6.1 Cost Recovery Index

Based on turn-over of the proceeds generated from 5069 shops in commercial areas and 2163 houses in residential areas, it is clear that a total of about =N=302,829,300 could be generated annually (=N=241,127,100 from commercial areas and =N=61,702,200 from residential areas). This figure when compared with the total input of =N=239,409,200 per annum gives a balance of =N= 63,420,100; which is equivalent to about 87.4% of the initial capital investment, as overall profit from *Maja* enterprises. In deed this supports the views of some of the service operators that 'in less than seven months, one can recover all his cost'. Thus, with this economic background, it can be affirmed that *Maja* enterprises is a prosperous business with a very high economic returns.

6.2 Energy Saving

Apart from monetary gains derivable from *Maja* enterprises, the service providers also promote energy resource savings by not allowing their customers to use bulb but rather low energy demanding lamps such as compact fluorescent lamps and improved phosphors. In deed it is one of the conditions for connecting consumers to *Maja* service (See 3 above). Although this measure is aimed at prolonging the life span of their electric generators as well as minimize cost and maximize profit, it has to a large extent promotes wide use of

low energy demanding lamps especially among the low income group (See Biermann, 1990 and Brennand, 1996). It has been observed that all the customers patronizing *Maja* services in both commercial and residential areas are using low energy demanding lamps, which UNDP (2000) suggested as the best sustainable energy strategy as regards to lighting.

VII. ENVIRONMENTAL IMPLICATION

In spite of ease and economic benefits derived from *Maja* enterprises, it also goes along with negative environmental and human health repercussions. Analysis of field measurements revealed that the sound produced by 87% of the sampled *Maja* generators within the radios of 10 metres is greatly above both night and day thresholds of 36dB and 65dB respectively. Thus, apart from contributing in raising sound and vibration levels of the immediate surroundings, also *Maja* generators induce noise pollution and associated consequences. Table 6 shows mean and cumulative mean noise levels around some of the sampled *Maja* generators in Muhammad Abubakar Rimi (M.A.R.) Market.

Table 6: Mean Noise Level in Relation to Distance Away from Generation Site

Sample Points	On Sport	5 Metres	10 Metres	Mean Total	Cumulative Mean	Remark
1	92.3	91.0	81.9	88.4	90.13	Risky
2	96.3	87.2	86.7	90.07	88.46	Risky
3	98.5	88.5	88.0	91.7	86.83	Risky
4	96.1	87.1	86.7	89.97	88.56	Risky
5	92.2	90.7	88.7	90.33	88.2	Risky
Mean	95.08	88.9	86.4	-	**88.44**	Risky

Source: Fieldwork, 2014

Table 6 above shows little variation in relation to the sport of *Maja* generators and at about 5 to 10 metres away. As a whole the cumulative noise level reached 88.44dB; which going by the threshold limit of 65dB (during day times) is extremely high and as well suggests that the surrounding area up to the radios of 10 metres is not safe. A Focus Group Discussion with respondents revealed that the immediate problems they are facing while staying or running their affairs around *Maja* installation are: distortion of cell phone communication and radio signals; stressful talking and hearing; and sometimes dizziness and lost of voice.

Apart from inducing noise pollution, *Maja* generators also raise the temperature level of the respective local surrounding by about 9.2^{o}c to 14.1^{o}c during operation periods. Records of temperature measurements, at one hour intervals, around 8 *Maja* generators (5 in commercial areas and 3 in residential areas) revealed that *Maja* generators have some local effect of increasing the surrounding temperature at 10 metres radios by a mean of 11.74^{o}C during operational hours. The detail finding is presented in Table 7.

Table 7: Mean Temperature around Sample *Maja* Generators

Location	Control Temp.	Observed Mean	Departure	Mean Deviation	Duration
Abattoir	34.0	46.6	12.6	0.86	10am - 6pm
Dorayi Comm.	34.0	45.7	11.7	- 0.04	10am - 6pm
Kwari Market	34.0	48.1	14.1	2.36	10am - 6pm
M.A.R. Market	34.0	47.8	13.8	2.06	10am - 6pm
Wambai Market	34.0	46.9	12.9	1.16	10am - 6pm
Darayi Resid.	34.0	43.2	9.2	- 2.54	6pm - 12pm
Dakata	34.0	44.1	10.1	- 1.64	6pm - 12pm
Jaen	34.0	43.5	9.5	- 2.24	6pm - 12pm
Total Mean	34.0	45.74	11.74	-	-

Source: Fieldwork, 2014

However, the immediate consequence of this is mostly felt on human health. An interview with operators who stays around throughout operational hours revealed that very often they run into problem of dehydration due to excessive sweating induced by excessive heat from their respective generators. Moreover, records of ambient air quality around the 8 sampled *Maja* generators show that local air ventilation is also affected by *Maja* generators due to smoke emission. The amount of carbon-dioxide in the surrounding *Maja* sites (10 metres radios) increases by a mean of about 382.75ppm compared to that of control site (15.0ppm). This suggests that the cumulative effect of exhausts released by *Maja* generators reduces ambient air quality of

the immediate local surrounding and as well adds to the gross amount of carbon-dioxide level of Kano metropolis. Table 8 shows the observed finding.

Table 8: Ambient Air Measurement around some *Maja* Generators

Location	Parameters with Threshold Limit			Remark
	CO_2 1000ppm	CO 11.4ug/m^3	SPM 250ug/m^3	
Abattoir	426	3.07	58.05	Fair
Dorayi Comm.	310	3,83	44.80	Fair
Kwari Market	430	3.47	58.50	Fair
M.A.R. Market	500	4.05	109.5	Need Attention
Wambai Market	415	3.65	55.35	Fair
Darayi Resid.	205	2.40	26.70	Fair
Dakata	510	5.09	120.75	Need Attention
Jaen	386	3.50	50.36	Fair
Total Mean	397.75	3.15	65.50	-

Source: Fieldwork, 2014

Although the levels of the observed parameters, CO_2, CO and SPM are within the threshold limits, but in particular, frequent exposure to CO_2 according to USEPA (1988) 'can cause headache, increased heart rate, dizziness, fatigue, rapid breathing, and visual and hearing dysfunctions. Exposure to higher levels may also cause unconsciousness or death within minutes of exposure'**.** The glaring effect as it relates to *Maja* sites is staining of paints of the surrounding structures and stationary objects. Also respondents complain of dizziness which could be due to frequent exposure to smoke emission (CO_2) not to high noise level as indicated earlier or both. Improper disposal of used engine oil and leakage of gasoline (diesel) and other lubricants contaminate soil of the immediate sites of *Maja* generators. It has been observed that in all the inventoried 70 *Maja* generators sites there are no adequate measures taken to do away with leakages and spills of lubricants and diesel. As such the soils colour of all the inventoried *Maja* generators sites have changed from light and dark brown to black, the texture is very compact and as well the bulk density (BD) is high. Other physical features been observed are low available water holding capacity (AWHC) and no signs of grasses at the radios of 3 to 5 metres around all the sites of *Maja* generators.In view of the above environmental profile of *Maja* operation, it is quite glaring that it is not environmentally friendly, thus its environmental viability depends only on sound and effective remediation measures.

VIII. CHALLENGES

Although the social and economic basis of *Maja* enterprises as elucidated above may stand as its prosperity but the legal and environmental implications on the other hand can be seen as the greatest challenges that require good and careful management otherwise it may leads to a precarious situation. Legally, the organisation responsible for electricity production and supply in Nigeria is the National Electric Power Authority, known as NEPA, which has been renamed the Power Holding Company of Nigeria (PHCN). In spite of the promulgation of the decree No. 25 of 1988 on commercialization and privatization of government properties and parastatals; the amended Electricity and NEPA act of 1998 and the 2001 National Electric Power Policy, still there is no legal provision or backing for informal private sector participation in electric power generation and distribution to the public. This encumbrance to say the least would constitute a serious threat to the sustainability and future development of *Maja* initiatives. Equally, the Federal Environmental Protection decree No.58 of 1988; amended by decree No. 59 of 1992 and the Nigerian National Policy on the Environment (Revised Edition, 1999) have zero tolerance to all the identified environmental risks and hazards associated with *Maja* operations. Therefore, unless sound and effective remediation measures are put in place, the *Maja* enterprises would face an unfavorable reaction from environmental pollution abatement and enforcement bodies such as National Environmental Standard and Regulation Enforcement Agency (NESREA).

IX. CONCLUSION

However, from whatever direction *Maja* has been look upon, yet it has represents human basic response to change; a change due to high rate of urbanization and population growth; a change due to hardship; and a change due to social inequality and reckless governance. Thus unlike most common coping strategies that

centred around non monetary requirement (See, Sauerborn et al. 1996); order of importance; income diversification; reduced food consumption; use of savings; and sale of assets particularly livestock and household goods such as bicycles, jewelries, and radios (See Rugalema, 1998; Webb and Reardon 1992; Barnett and Blaikie, 1990 and 1992), *Maja* strategy is rooted on technological devices (by modifying the situation) and market exchange (for the effective operation of coping strategies). It has demonstrated how peripheral groups cope in times of hardship; relatively similar to the works of David (1993); Duffield (1990); Swift (1989); and Kezaala and Bataringaya (1998), although they are specific on the matter of enviro-economic stress.Moreover, the *Maja* strategy can be seen as another kind of effective response and innovative mechanism that characterized human population in Kano metropolis and Kano Close-Settled Zone in general (See Mortimore, 1993; Mortimore and Tiffen, 1995; and Maigari, 2014 for the others). Therefore, in order not to distort the trend of innovative capabilities and adjustment mechanism inherent in population – resource relationship in Kano metropolis in particular, the following recommendations should be adhered to: i) in the interim government should formally inaugurate *Maja* service providers by giving them operational permit or license under franchise agreement with adequate supervision in order to check ill practices; ii) the National Power Policy should be revised to take local arrangements and initiatives such as *Maja* in to consideration; iii) the existing *Maja* facilities should be subjected to full Environmental Evaluation (EE) while the subsequent *Maja* proposals should under go Environmental Impact Assessment (EIA); iv) the on-going national electric power privatization exercise, to which Kano State Government is a party to it, should be laid on a sound foundation so as to allow a stable and steady electric power supply in Nigeria in general; v) good governance is the best medication to the all forms of crises bedeviling Nigeria in general not only the current national energy crises, thus it should be pursued at all levels.

REFERENCES:

[1] Barnett, T, and Blaikie, P. (1990) Community Coping Mechanisms in the Dace of Exceptional Demographic Change. Final Report to the Overseas Development Administration, London, ODA (July).

[2] Barnett T, and Blaikie P (1992) AIDS in Africa: Its Present and Future Impact, John Wiley & Sons Ltd, Chichester, UK.

[3] Biermann, E. R. K. (1990) "Solar Home Systems - An Energy Supply Option for Rural Areas", UNITAR/UNDP, Photovoltaic Resources: Applications, Utilization and Assessment - Guidebook for Policy Planners, Rome 1990, pp. 87 - 90

[4] Brennand, T., (1996) Concessions for Windfarms: a New Approach to Wind Energy Development. Report prepared for the Working Group on Energy Strategies and Technologies of the China Council for International Cooperation on Environment and Development, Beijing, China

[5] David Keen (1993) Famine, Needs-assessment and Survival Strategies in Africa (Oxfam, 1993, 40 p.)

[6] Duffield, M. (1990) War and Famine in Africa (Oxfam, 1991, 36 p.)

[7] Federal Republic of Nigeria (1988) Environmental Protection decree No.58 of 1988

[8] Federal Republic of Nigeria (1988) Privatization and Commercialization Decree No. 25 of 1988.

[9] Federal Republic of Nigeria (1992) Environmental Protection decree No. 59 of 1992 (Amended)

[10] Federal Republic of Nigeria (1998) National Electric Power Authority (NEPA) act of 1998

[11] Federal Environmental Protection Agency (1999) Nigerian National Policy on the Environment (Revised Edition, 1999)

[12] Federal Republic of Nigeria (2001) National Electric Power Policy

[13] Kezaala, R. and Bataringaya, J. (1998) "The practicalities of Orphan Support in East and Southern Africa: Planning, and Implementation of Multi-sectoral Social Services for Children and Child Carers", Paper presented at the Conference on Raising the Orphan Generation, Pietermaritzburg, (June 9 - 12).

[14] Maigari Ahmed Ibrahim (2014) How Far is Too Far? The Facts and Figures on Human Population in Kano State. *International Journal of Humanities and Social Science Invention ISSN (Online): 2319 – 7722, ISSN (Print): 2319 – 7714 www.ijhssi.org Volume 3 Issue 4 || April. 2014 || PP.61-64*

[15] Mortimore, M. (1993) The Intensification of Pre-Urban Agriculture: The Kano Close-Settled Zone, 1964 – 1986. In B. L. Turner II, Goran Hyden, and Robert Kates Eds. Population Growth and Agricultural Change in Africa, University Press Florida.

[16] Mortimore, M. and Tiffen, Mary (1995) Population and Environment in Time Perspective: The Machakos Story, in Tony Binns Ed. People and Environment in Africa. John Wiley and Sons

[17] Rugalema G., (1998) It is not only the loss of labour: HIV/AIDS, loss of household assets and household livelihood in Bukoba district, Tanzania, Paper Presented at the East and Southern Africa Regional Conference on Responding to HIV/AIDS: Development Needs of African Smallholder Agriculture, Harare (June 8 - 10).

[18] Sauerborn R, Adams A, Hien M (1996) Household Strategies to Cope with the Economic Costs of Illness. Social Science and Medicine, 43(11):291 - 301.

[19] Swift, J., (1989) Why are rural people vulnerable to famine?', IDS Bulletin, Vol. 20, No 2, pp. 8-15.

[20] UNDP (2000) UNDP, UNDESA and the World Energy Council (WEC) (2000), the World Energy Assessment, New York.

[21] USEPA (1988) United State of America, Environmental Protection Agency, Operational Guide, CO2 Emission Limits.

[22] Webb, P. and Reardon, T. (1992) Drought Impact and Household Response in East and West Africa. Quarterly Journal of International Agriculture, 31(3):230 - 246.

[23] Webb D (1995) Orphans in Zambia: Nature and extent of demographic change. AIDS Analysis Africa, 6(2):5 - 6.

[24] A Review of Household and Community Responses to the HIV/AIDS Epidemic in the Rural Areas of Sub-Saharan Africa (UNAIDS, 1999, 67 p.)