

Neglecting the Un-Neglected: The Economy of Unconventional Compost in Kano Metropolis

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Abstract:

The paper assesses the silent economy of these waste organic products in Kano metropolis, which has been presumably neglected by formal sector. The method used include: Inventory; Direct Field Measurement; Focus Group Discussion (FGD); In-depth Interviews and Case Study. The result shows that the economy of unconventional compost (Takin-bola) in Kano metropolis has a good prospect and high potentials that should be recognized and cherish by both formal and non-formal sectors. The paper recommends that, there should be sound policy and programme design to harness the potentials of Takin-bola and develop its efficacy, so as to attract private sector to invest and invent adequate mechanisms of more proper utilization; and the entrepreneurs should add animals manure (small ruminants in particular) while processing Takin-bola, in order to improve some of its deficiencies; among others.

Keywords: Economy; Unconventional-Compost; Neglecting

1. Introduction

The success of crops production from the historical past to date can not be separated from the significance of organic material to plant growth and yield. Plant nutrients such as phosphorus, potassium, magnesium, sulphur, calcium and iron (needed in large quantity) and boron, molybdenum, copper, zinc, chlorine and cobalt (needed in small quantity) are chiefly obtained from organic material, for use at various stages of plant growth, such as establishing themselves, growing and fruit yielding, among others (Pius, 1992). Availability of these nutrients in the soil, all things being equal, depends on the cultivation factor, which normally decreases with increase in cultivation. Thus, this makes soil fertilization very necessary as fertility decreases, through either application of organic manure or artificial chemical fertilizers. In most rural areas in the developing countries in general, and Nigeria in particular, ample use of chemical fertilizers has been constrained by so many factors, such as cost of procurement, non-availability, and danger to plants and soil (misapplication). As such, the dominant use of organic manure becomes inevitable.

In the Kano Close-Settled Zone, agricultural intensification, has not only makes organic manure scarce but also made unconventional compost from decomposed and semi-decomposed urban waste and gutters a merchandise commodity with lucrative profit and potential area of investment. The aim of this paper, therefore, is to assess the silent economy of these waste organic products in Kano metropolis, which has been presumably neglected by formal sector.

2. Source and Volume

Kano metropolis, with a population of over 3 million people produces about 240 thousand metric tones of waste daily; about 98.5% from industries; 1.4% residential areas; and 0.1% from commercial activities (Maigari, 2014). The greater parts of waste from residential and commercial activities are biodegradable; although small in terms of the overall volume (1.5%), but it represents a great challenge to the Refuse Management Authority (REMASAB) in the metropolis in terms of collection and disposal. Based on collection and disposal indexes, Maigari (2014) observed that less than 40% of the refuse generated from residential and commercial activities in Kano metropolis is effectively and efficiently collected and disposed up. As such, the remaining balance of over 60% is left un-disposed in collection points or centres and along open gutters and drainages for several months and in some cases a year or more. In that respect, combine factors of time, moisture, micro-organism, and at times fire (burning) produces semi-decomposed and full compost manure that pre-urban crops and gardening farmers collect or buy to fertilize their farms.

An inventory of refuse collection centres in Kano metropolis revealed that there are about 467 interception points, out of which about 89% (416) are formal collection points while the remaining 11% (51) are illegal dumps. Ahmad (2007) observed that only 16% of the formal refuse collection centres are being attended twice a month; 65% once in two to three months; and 19% not attended at all. An analysis of these irregularly and un-attended refuse collection centres shows that on average each yields about 10.5 trucks load of decomposed and semi decomposed materials. Moreover, a truck load of refuse yields about 4,000kg; 75% of which is organic material and the remaining 25% is compose with cellophane material, broken glasses and bottles, plastic, metals, and stones. On a general note therefore, irregularly and un-attended refuse collection centres yields about 166,400 metric tones of organic materials annually, which is vehemently used by peasant farmers as organic manure locally known as *Takin-bola*. A study by Harris (1996) revealed that farmers in Kano Close-Settled Zone applied a mean of 4.3 tones of organic manure per hectare of farmland.

3. Manure Processing

As domestic and commercial waste are generated from various segments of Kano metropolis, so also the processing of organic waste materials. After generation, it is usually processed at various locations of the metropolis and by many people of different interest. Notable among them are: i. full term scavengers; ii. agricultural produce traders and/or transporters; iii. peasant farmers; and iv. unemployed youth. While the processing is conducted in two main ways; the on-site processing and the off-site processing. The on-site processing involves processing of waste material at the collection points or dumping grounds and it is usually operated in small scale by full term scavengers and unemployed youth. Whereas off-site processing as the name implies is conducted away from interception points or centres, mostly in open space (outskirt) or farmlands, on large scale and is partake by agric produce traders and transporter and peasant farmers. In general, the processing involves tilling up the waste dump into a lose state with the aid of shovel, digger, hoe, or mechanically operated machines such as caterpillar or bulldozer (usually in an effort to transport the waste to elsewhere). Next to that is manual sorting and separation of the contents, usually, into six different components; organic material, stones, metals, broken glasses and bottles, plastic, and cellophane products.

4. Production Cost

The cost involved in the processing of organic manure from urban solid waste in Kano metropolis ranges from =N=1,000.00 to =N=10,000.00 for small scale entrepreneurs and up to =N=100,000.00 or more for large scale entrepreneurs. Such amount is usually expended on associated products or services and some times on the organic waste itself. Notable among these are, baggage; transportation; hired labour; and tools. Full term scavengers and unemployed youth who habitually process organic manure at refuse interception centres or illegal dumps sales it uprightly without incurring much cost; mostly only that of baggage. While those that processed off-site spends a lot. An in-depth study with one of the large scale operators reveals that less than =N=10,000.00 is needed to process a single truck load of urban solid waste from source to the terminal spot. Table 1 shows the details findings.

Table 1: Cost of Production of Organic Waste Manure

Items	Cost in Naira	%	Remark
Truck Load	4,500.00	48.4	
Labour for Sorting	1,500.00	16.1	Per truck load
Baggage	2,400.00	25.8	=N=80/sack x 30
Transportation	900.00	9.7	=N=30/sack
Total	9,300.00	100	

Source: Fieldwork 2014

5. Economic Products

As observed by Olofin (2004) that the solid waste composition in Kano metropolis is made up of about 71.6% organic materials and the remaining 28.4% non-biodegradable substances such as glasses and metals, this study has not only confirm that but also revealed that about 90% of it is economically utilised. Apart from organic materials which is used as manure in crops production, products such as metal scraps; plastic materials; stones; and cellophane materials are also, being sorted for reuse or recycling. An in depth study of six truck loads of decomposed solid waste from one of the irregularly collection centres from the old Kano city revealed that from each truck load an average of 30mt (metric tones) of organic manure is obtained (about 75%) and additional 6.5mt (25%) of cellophane materials, plastic, metals, stones, and glasses. Among these, only broken bottles and glasses are considered as waste, the rest are packed in sacks of different sizes for either use or sale to users or recycling industries. In the case of cellophane materials, however, it is further processed through partial burning in an air-tight or open container or controlled dug pit that makes it to solidify. The resultant product locally called *Ayafa* is used as a fire wood substitute or burning enhancer during wet season. Table 2, shows the details of the findings.

Table 2: Composition of Domestic Solid Waste Stream in Kano Metropolis

Content T. Load	Volume	%	Market Value (=N=)	
Organic Mater.	30mt	75%	100Kg	500.00
Glasses	52kg	0.8	-	-
Stones	201.5kg	3.1	50Kg	400.00
Metal Scraps	26Kg	0.4	1Kg	10.00
Plastic	104Kg	1.6	1Kg	8.00
Cellophane	123.5Kg	19.1	1Kg	20.00
Total	36.5mt	100	-	-

Source: Fieldwork, 2014

5.1 Input – Output Analysis

Based on the circumstances of large scale operator, an entrepreneur injects less than ₦10,000.00 to process a truck load of organic waste (See Table 1 and Plate 1 & 2) and out of which he obtains about 30 sacks (100Kg each; See Plate 3 &4) of organic manure, 4 sacks (50Kg each) of stones and three more additional products (See Table 2, column 2) valued at about ₦20,152.00 (Table 2, column 5). This shows a benefit of over 100% (₦10,852.00) profit, which under market economy could be described as highly lucrative and prosperous venture. In the case of small scale operators, entry capital in some cases is almost zero; the basic requirement is self labour whose intensity and duration determines the amount of output. An in depth study with full term scavengers revealed that during the periods of organic waste harvest, on average an individual earns about ₦1,750.00 (about \$11.00) per day from selling of *takin-bola* and additional ₦500.00 from scrap materials such as metals and plastic. Thus, this entails how simple and productive the economy of unconventional compost is in Kano metropolis and as well show case its viability in terms of investment.



Plate 1: A Truck Load of Decomposed Urban Waste



Plate 2: Another Outlook of Decomposed Urban Solid Waste: Truck Load



Plate 3: Sacks of *Takin-bola* ready for sales



Plate 4: An Outlook of *Takin-bola*

6. Harvest and Sales

The harvest and sales index of *Takin-bola* in Kano metropolis goes concurrently; they are conducted during the dry season, usually from late December through January to May each year. Focus group discussions with Scavengers and Agric Produce Transporters revealed that January to April are characterized with low farming activities, ample space and low moisture, in contrast to wet season, are periods they heavily engage in processing organic manure from urban solid waste and its subsequent sales. While around November, December, May and June the level of processing and sales are low due to their respective peculiarities such as crops harvest and farm clearance. Table 3 shows the observed calendar pattern.

Table 3: Calendar of Organic Waste Harvest in Kano Metropolis

Periods	Proportion	Rate of Sales
November	Very Low	Low
December	Low	Low
January	Moderate	High
February	Very High	High
March	High	High
April	Moderate	High
May	Low	Low
June	Very Low	Low

Source: Fieldwork, 2014

Although, the proportion of harvest varies with increase in dryness, but the unit sale price virtually remains uniform. Moreover, the selling activity is carried out in two ways; the on-site sales and the off-site sales. The on-site sales involved buying or selling the products at the processing ground and the buyer is responsible for transporting his goods. While, the off-site sales involved the seller taking the products away from processing ground to buyer. Agric produce traders and transporter are mostly involved in this kind of marketing, who on going to buy or carry produce; take along organic manure with them. The common areas that patronize *takin-bola* from Kano metropolis are mostly those under irrigation scheme such as Kura to the South, Gude to the West, and Danbatta to the North. Specifically, they use *takin-bola* for the cultivation of crops such as maize and vegetables such as onion, tomatoes, carrot, and okro.

7. Preference Ranking

In addition to *takin-bola*, farmers in Kano Close Settled Zone in particular used other different kinds of organic manure. Notable among them are: *Toka* (ash); goat and sheep droppings (*Kashin Awaki* and *Tumaki*); Cattle droppings (*Kashin Shanu*); and poultry waste (*Kashin Kaji*). Depending on their availability or the circumstances of individual farmer, these four different types of manure are either used in entity or in combination of two or more. However, in terms of importance to crops, a Focus Group Discussion with peasant farmers revealed that *Kashin-Kaji* (Poultry waste) was most preferred but is low in supply and costly to obtain compared to the other four. On the overall ranking, *Takin-bola* was ranked second (See Table 4); it has been described as of very high importance to crops, plenty, less costly, and can last for up to three consecutive crops cultivations periods without being exhausted. Respondents maintained that *Kashin-shanu* (cattle droppings) has the disadvantage of attracting insects (usually beetles that destroy crops) and contains high weed seeds that make weeding very difficult, thus ranked forth. *Toka* (ash) was ranked last due to its exhaustibility but respondents maintained that it is the best in the condition of low soil moisture. This goes with analytical findings of Phillips-Howard (1995) that ash material has a high pH (10.2), which tends to neutralize soil acidity and contributes to soil-softening effect.

Table 4: Preference Ranking of Types of Organic Manure by Farmers

Manure Type	Ranking				Overall Score
	Importance to crops	Exhaustibility	Availability	Cost	
<i>Toka</i>	Moderate	Once	V. High	V. Low	5
<i>K. Awaki</i>	High	2 Years	High	Low	3
<i>K. Shanu</i>	High	2 Years	Moderate	High	4
<i>K. Kaji</i>	V. High	2 – 3 Years	Low	V. High	1
<i>T. Bola</i>	V. High	2 – 3 Years	V. High	V. Low	2

Source: Fieldwork, 2013/14

8. Analytical Implication

Perpetual use of *Takin-bola* by farmers in Kano Close Settled Zone and elsewhere in Northern Nigeria in general, has drawn the attention of numerous scholars on its implication on farmlands (soil), the crops grown therein, and urban environmental management, among these are Phillips-Howard (1995); Tudunwada (1996 & 2007); Olofin (2004); Ahmad (2007); and Maigari (2014). Pertaining to soil physical properties such as bulk density (BD) and available water holding capacity (AWHC), Tudunwada (1996) observed that the farms treated with *Takin-bola* recorded high bulk density and low AWHC. Presumably, this entails perpetual use of *Takin-bola* would significantly affects BD and AWHC which if exceeds the threshold of 1.75g/cm³ (BD), according to Jones and Wild (1975) would negate root penetration of crops. Apart from physical property of soil, *Takin-bola* has also been found to exert various degrees of modifying the chemical properties of the soil treated with. Table 5, shows some of the analytical findings of chemical properties of the soils treated with *Takin-bola*.

Table 5: Soil Chemical Properties of some Farmlands Treated with *Takin-bola*

Parameters	Sampled Farmlands				Mean	Remark: Levels of contributions to soil
	A	B	C	D		
pH	5.26	6.56	6.14	5.61	5.89	Good
EC	0.04	0.02	0.02	0.03	0.027	High
%N	0.054	0.046	0.035	0.076	0.053	Low
%OC	0.415	0.515	0.41	0.53	0.467	Low
AP	1.76	1.75	1.21	1.30	1.50	Moderate
Na	2.5	1.1	0.99	1.1	1.42	Relatively High
K	0.17	0.39	0.07	0.1	0.18	High
Mg	0.11	0.17	0.1	0.09	0.12	Low
Ca	0.24	0.15	0.17	0.19	0.19	Moderate

Source: After Tudunwada, 1996

Column 7 of Table 5 indicates the levels of contributions of *Takin-bola* to the soil of the farmland treated with. It has further suggests that *Takin-bola* contains high amount of potassium (K) and sodium (Na); moderate amount of prosperous (AP) and calcium (Ca); low amount of magnesium (Mg), organic carbon (OC), and nitrogen (N); but with good pH level. The level of electrical conductivity (EC) has been observed to be high, although within the threshold, but it seemingly suggests high vulnerability to salinity hazards. This connotes that *Takin-bola* is not a perfect soil minerals conditioner; as such it can not be used alone but preferably in combination with animal's manure which has been established as a good source of organic matter.

9. Sustainability and Prospect

A system or action is said to be sustainable if it is economically viable, environmentally friendly, culturally acceptable, and socially justifiable. Thus the forgoing analysis has adequately demonstrated that the mercantile economy of *Takin-bola* in Kano metropolis is economically feasible as there is a ready market for it; its supply is continuous; the profit margin is tremendously very high; and it has provided ample job opportunity to several people. From the environmental aspect, it is contributing immensely to agricultural ecology (crop production); maintenance of soil stability; and adding quality to urban environmental management through waste recovery index. Culturally, it could also said to be accepted as it is being pursue by different people of different interest but with common economic goal. Neither the norms nor the value of the metropolitan communities prohibits, segregates, expulses, or subjugates its economic tentacles. Similarly, it is socially justifiable; it is regarded as a common property resource; provides a means of sustenance (livelihood) to many people; and has attracts the attention of many scholars and researchers.

This sustainable background, therefore, apparently suggests that there is a high prospect in the *Takin-bola* enterprises. As there are no encumbrances in its entry; its market is promising; and its posterity is to a large extent certain. Thus, there is great need to invest in this sector so as to improve and develop it more. Instead of spending huge amount of money annually for the procurement of chemical fertilizers it is better to use it to develop this sector which is ought not to be neglected by the formal sector but very peaty it is so in northern Nigeria in general not only in Kano.

10. Conclusion

From the foregoing analysis of the economy of unconventional compost (*Takin-bola*) in Kano metropolis it is evidently clear that it has a good prospect and high potentials that should be recognized and cherish by both formal and non-formal sectors. Formally, there should be sound policy and programme design to harness its potentials and develop its efficacy, so as to attract private sector to invest and invent adequate mechanisms of more proper utilisation. At the current operational level, the entrepreneurs should add animals manure (small ruminants in particular) while processing *Takin-bola*, in order to improve some of its deficiencies. In the absent of that the farmers that uses *Takin-bola* in their farms should as well mix it with animals manure or incorporates it with mulching. Although, all sorts of crops are grown in farms treated with *Takin-bola*, it is also suggested that legumes are included in the mix-cropping culture.

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