Towards a successful packaged water regulation in Nigeria

C. A. Dada

Microbiology Unit, Institute of Ecology and Environmental Studies, Obafemi Awolowo University, Ile-Ife, Nigeria. E-mail: ayokunled@yahoo.com. Tel.: +2347036268554.

Accepted 10 July, 2009

The importance of locally sourced, low-cost alternative drinking water schemes in contributing to increased sustainable access in developing nations cannot be over-emphasized. One of such initiatives in Nigeria, where public drinking water supply is endemic is packaged drinking water sold in sachets. Packaged water if improved upon has been suggested as alternative water provisions that could allow contributions from local initiatives in the drive towards achieving the water target of the Millennium Development Goals. This form of drinking water is easy to get and the price is affordable but people still worry about its purity. Successful regulation of the packaged water industry remains a challenge to the national agency established to enforce compliance with international standards. This study was conducted with a view to proffering recommendations that would enhance successful regulation of Nigeria’s packaged water industry and ultimately improve public health outcomes. Using data obtained from semi-structured interviews with principal office holders of the national regulatory agency, sachet water manufacturers and civil society groups, a rapid needs assessment of the existing regulatory system for packaged drinking water was conducted. Discussed are three major areas that demand prompt intervention- the adopted regulatory approach, collaborative stakeholder partnerships and institutional capacity. A seven-point recommendation is also presented. Opportunities exist for improvements in the current regulatory scheme that could make efficient the regulation of the packaged water industry.

Key words: Millennium development goals, packaged water, quality regulation, stakeholder partnership.

INTRODUCTION

In terms of quality and quantity of public water supply, the inadequacy of pipe borne water in Nigeria is almost endemic. An alternative to the seemingly inadequate water supply is found in packaged water commonly sold in sachets. As studies have shown that standard industrialized world model for delivery of safe drinking water technology is not affordable in much of the developing world (Gadgil and Derby, 2003), the importance of locally sourced, low-cost alternative drinking water schemes in contributing to increased sustainable access in rural and peri-urban settings of developing nations cannot be over-emphasized (UNCSD, 2004). Water packed in sachets if improved upon has been suggested as a low cost, readily available alternative water provision that could help bridge the gap and ultimately allow contributions from local initiatives in the drive towards achieving the Water target of the MDGs marked for 2015 (Dada, 2009).

Although it is easy to get and the price is affordable, people still worry about the purity of the sachet water. There have also been claims that it is sometimes poorly treated or oftentimes scooped directly from the many burst water pipes lying in the sewers that typically run along the roads and streets in the nation. The integrity of the hygienic environment and conditions where majority of the water in sachets in the markets are produced in areas has also been questioned (Ademoroti, 1996). Concerns of vertical transmission of disease pathogens by vendors have been raised. Although documented evidence is rare, there are claims (CAMON, 2007) of past outbreaks of water borne illnesses that resulted from consumption of polluted sachet waters most of which are of unknown origin (Dada, 2009).

The National Agency for Food and Drug Administration Control (NAFDAC) is the sole regulator established and empowered to enforce compliance with the drinking water...
qualities guideline values as recommended by the World Health Organization (WHO, 1996). All packaged waters are mandated to undergo rigorous scrutiny by NAFDAC which results to certification and allocation of approval number. In the last 8 years, it has been noticed that many packaged water products have either not been registered or the producers have not completed the registration of their products with NAFDAC. Given the intense public campaigns against patronage of packaged water products without certification numbers, today tables appear to have turned. Genuine or not, virtually all products in the market display certification numbers, some in an attempt to deceive the population. It thus appears hard to prevent producers using fake NAFDAC numbers on the sachets. Even those who were registered have been observed to fall below expected standard once registration had been approved. Although NAFDAC declared a possible ‘gradual’ nationwide ban on sachet waters to allow the manufacturers of sachet water to start winding-up or change to bottle packaging (CAMON, 2004), the sachet water market is witnessing tremendous growth. Successful implementation of this ban has remained far from reality.

A careful review of literature on the subject reveals that previous studies focused on packaged water using an entirely scientific approach - its microbiological and physico-chemical quality- and not the regulatory aspect. This partly explains why substantial recommendations on the regulatory aspect of packaged water have not emerged. It is imperative therefore, to conduct a rapid needs assessment of the existing regulatory system for packaged drinking water with a view to proffering recommendations that would enhance its successful regulation.

MEHODOLOGY

Using oral interview method, principal officers of NAFDAC, the sole regulatory agency for packaged drinking water, were approached for information relating to their institutional capabilities, management functions and coping capabilities given the multitude of products they regulate, adequacy of staff, transparency and integrity concerns, their approach to regulation and surveillance, the estimates of registered waters, trend of registration in the last few years, issues with technologies allowed, concerns of difficulties and costs of registration processes, illiteracy and the demands of the requirements. Also considered were opportunities for collaborative work with relevant stakeholder. Similar questions were also presented to participating officers of the association of table water producers (ATWAP).

Simple structured questionnaires were used to interview randomly selected residents of the community to establish the perceptions of the people with respect to access to public water supplies and other available alternatives. For consumers of sachet waters, consideration was given to their preferences and factors that determine their choice, their views about the sachet water producers, their level of awareness and trust in the regulator’s minimum requirement and stipulations, the level of awareness on details of product information, level of awareness on hygiene and sanitation. Public reaction to defaulting manufacturers and also the perceptions of the masses (consumers and local manufacturers) on the policy drive of the packaged water regulator was also assessed.

Interviews were also granted by civil society and consumer protection groups to identify avenues for collaborative partnership with regulator and other stakeholders in promoting improved public health.

During the study, questionnaires were administered to members of households using judgemental convenience sampling technique because of the characteristic of the study population. During the collation of the data, the possibility of bias owing to political dissatisfaction of respondents to the government in power was not ruled out. In such situations, the socially desirable option generally tilts towards supporting the masses and opposing the government. According to Wiseman (1972), response bias is likely to be a problem in personal interviews whenever the question being asked is one for which there exists a socially undesirable response. However, to ensure validation of such claims, verification of the responses was done by actually visiting mentioned locations (malfunctioning taps, visit to water manufacturing facilities) referred to during the course of the interviews. As cited by previous studies (Turner et al., 1992; Aquilino, 1994), another option to minimize issues with socially desired outcomes would have been to use self-administered questionnaires instead. However, this seems illogical an approach to obtain research information in a setting where according to WaterAid (2006) and Anneke (2002), some 50% are below age 15 and over 43% of the adults are illiterate. The need for physical presence of the interviewer for example in explanation and often times, interpretation in local dialect was thus warranted. Besides, ‘a survey, need it be said, is not just a neutral data-collecting procedure: the process always involves interaction between interviewer and respondent’ (Beck et al., 2002). Summarily put, the combination of different methods (interviews, observations and questionnaires) used with the respondents in the study gave a more accurate picture and according to Payne (1964) tends to ‘produce results more efficiently’ than one method alone could do. Care was taken to ensure that the questions had mutually exclusive options, leaving no ambiguity in the mind of the respondent. Where the questions appear not to be so, provisions are made for more comments which are especially useful in deducing other information when interpreting the data.

RESULTS AND DISCUSSION

Albeit through quite challenging times, the present NAFDAC has witnessed significant progress in seeing to the effective actualization of its mandate on packaged water regulation through the provisions of GON Decree 19 of 1993 and its accompanying guidelines - no food or drug item may be imported, advertised, sold or distributed in Nigeria unless it has been registered by NAFDAC. The current study aimed at conducting a rapid needs assessment of the existing regulatory system for packaged drinking water with a view to proffering recommendations that would enhance its successful regulation and ultimately improved public health outcomes in the country at large. Three core issues identified from the collated information from the packaged water manufacturers, civil society and consumer protection groups and the regulatory agency are presented:

Regulatory approach

It was observed during the study that the regulatory agency’s approach has largely been reactive often focusing
moves through the source-factory-consumer chain. Significant health hazards of the water in sachets as it moves through the production process. A comprehensive water safety plan will control points critical to the entire cycle of the packaged water production process. One attempt was made to apply the HACCP in identifying recontamination during storage, distribution and handling of drinking water. The incorporation of HACCP approach in the packaged drinking water industry will herald the introduction and implementation of a workable water safety plan. The potentials for collaborative partnership and active stakeholder engagement appear not to have been harnessed in a quest to achieving a sanitized packaged water industry. Official records indicate that several national workshops and ‘consultative meetings’ have been held with the states associations of packaged water producers, intending producers and other stakeholders. These meetings have been ‘well attended’ and ‘the active participation of the producers yielded positive results’. Much care need be exercised however when referring to active stakeholder engagement especially as it relates to the term ‘participation’. For example, based on interview information obtained from respondents, the consumer groups and the manufacturers’ group desire to be actively involved in surveillance but the apparent fear of abuse of power among others is partly responsible for such desired ‘active participation’ being restricted to mere ‘twice-in-a-year’ table engagements by the regulatory agency. This situation is similar to a rung of Arnstein’s ladder of citizen participation (1967) when the input of citizens’ ideas are restricted solely to the stakeholder meeting level, participation remains just a window-dressing ritual and participation is primarily measured by how many come to meetings. Correcting for deficiencies in Nigeria’s packaged water regulation may therefore demand for more purposeful engagement that allows active involvement of relevant stakeholders. Active engagement of all stakeholders promises great rewards for packaged water quality monitoring if well explored by the agency. With only less than 10 regional laboratories, packaged water samples in states where NAFDAC laboratory is not available may either have to be taken through long distances to be analysed or not analysed at all. Financial consideration has been the reason why weekly in-house microbial monitoring of these produced packaged water is not being done in many factory locations in the country. The resultant effect is a compromise on surveillance schemes aimed at public health protection. The current study suggests several other laboratories of similar capacities exist in local

**Collaborative stakeholder partnership**

The incorporaion of HACCP approach in the packaged drinking water industry will herald the introduction and implementation of a workable water safety plan that is holistic in its approach, that is, plans aimed at preventing contamination of source waters, subjecting the raw water to as much treatment as to reduce or remove contamination that could be present to the extent necessary to meet the water quality targets and preventing recontamination during storage, distribution and handling of drinking water. A comprehensive water safety plan will with due diligence incorporate as much as possible, control points critical to the entire cycle of the packaged water production process.

Following visits to packaged water factories, careful attempt was made to apply the HACCP in identifying significant health hazards of the water in sachets as it moves through the source-factory-consumer chain (Figures 3a, b). Despite the rewards the HACCP approach promise, there could be difficulties in influencing local manufacturers to incorporate the approach into their production process given the strength of unskilled labour involved in the production process. This limitation however could be overcome by mandating the recruitment of at least two qualified production personnel per packaged water factory. Another envisaged limitation inherent in the approach could be the need set up arbitrary critical performance limit targets (CPLTs) for each CCP to determine or evaluate to what extent each contributes to the process and to predict what the effect would be if any of the CCPs should fail. This calls for more scientific research.

**Figure 1.** End-of-the-rod approach: massive destruction of poorly manufactured water in sachets. Source: NAFDAC News (2007).
Table 1. Steps in developing and HACCP plan.

<table>
<thead>
<tr>
<th>Step</th>
<th>Activity</th>
<th>Initial steps in the HACCP process</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Assemble a team</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Describe the product</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Document intended use of product</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>Construct a process flow diagram</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>Validate process flow diagram</td>
<td></td>
</tr>
</tbody>
</table>

1. Identify hazards and preventive measures
2. Identify CCPs
3. Establish critical limits
4. Identify monitoring procedures
5. Establish corrective action procedures
6. Establish record keeping and responsibility
7. Validate HACCP plan

universities and other independent research authorities as the IPAN- Institute of Public Health Analysts (IPAN). These could be harnessed to strengthen current packaged water certification and monitoring schemes.

Again, collaborative partnership portends possible solutions to the issue of post-certification demise which sees the regulatory agency hearing the last of the manufacturer only during the registration process. This has in the time past resulted in the lack of consistency in the quality of products after NAFDAC laboratory certification as packaged water producers work very hard at producing good quality water only for NAFDAC registration purpose and once the NAFDAC certificate is obtained they revert to producing unsafe drinking water due to inadequate good manufacturing practices in the production processes. A possible solution to this phenomenon is not far fetched. The current study revealed that state manufacturer’s groups and associations if allowed are willing to partner with NAFDAC and take up supportive regulatory roles since they maintain contact with the producers after the registration process as they compete in the same markets for buyers. This was easily deduced from information gathered from the association of packaged water manufacturers: “if NAFDAC can give us all the support, maximum backing in terms of power and genuine recognition, that any one who intends registering a pure water company should go through pure water association first or in addition to the measures of screening put in place by them at NAFDAC... It is not as if we will be teaching the regulatory agency their job. No. It’s about cooperation to achieve common goals. Because if they know that our association is strong and is taken as important, even the manufacturers would be encouraged to join us. The manufacturers will also be willing to maintain the quality recommended by NAFDAC and jointly policed by the manufacturers’ association after the certification exercise. If NAFDAC can give us a strong support, the association would be revived from the weakening it is now to a strong one that has both the trust and the fear of the pure water manufacturers themselves. Again, it will also allow healthy quality competition [benchmarking]...and it is only this joint partnership that
**Figure 3a.** What is the risk? First element of a water safety plan.

- **Sachets:** Quality compromise and price concerns, leachability, toughness and label issues (batch number and expiry dates).
- **Source:** Tap or ‘upgraded wells’, seepage concerns for ‘upgraded wells’

**Figure 3b.** What is the risk? First element of a water safety plan.

- **Filtration efficiency:** General maintenance, clogging and backwashing issues.
- **Disinfection efficiency:** Replacement of UV tube, sufficient solids removal from pre-filtration?
- **Packaging efficiency:** Leakages?
- **Condition of packing/storage containers:** Contamination of not-well sealed sachets in the packing containers?

**g) Exposure to unhygienic and harsh storage conditions** (overstocking, seepage of contaminants into not-well sealed sachets, possibility of enhanced multiplication during storage, odour changes with prolonged contact with bare floor, silt/soil contact with sachets—not subsequently cleaned by final consumer who tears open with mouth

**h) Condition of vendor/container:** Sanitation and hygiene issues, Container with lid, Neatness, hand washing after responding to call of nature (no public toilets), possibility of passive infection/shedding pathogens e.g. S. typhi.
can make it work” (ATWAP).

But to the regulatory agency, this idea of joint surveillance through pre-registration mandatory identification with the manufacturers’ association is somewhat unethical for an agency is responsible to and funded by the government. The key questions are: how sufficiently independent should regulators be from government to allow them full operational freedom of action? To what extent does the method by which they are funded have an impact on the measure of their independence especially when a new initiative portends bright promises in bringing about the needed improvements? The reason for this public bureaucratic approach is not far fetched as characteristically most public bureaucrats in the nation are overly concerned about the security of their positions and as such not inclined to take new initiatives that contribute on the long run to efficiency (Okafor, 2005).

Institutional capacity

Another identified challenge facing the regulatory agency is related to institutional capacity. Although the regulatory agency claims to be equipped with reasonable manpower and institutional wherewithal to effectively cope with the regulatory challenges of the packaged water industry in Nigeria, it could be that NAFDAC does not have the right professionals, capable of recommending safe water for the public. According to a national newspaper (2004) "what NAFDAC has are pharmacists who man its laboratory, they don’t have qualified water scientists and engineers trained to ensure the safety of water being consumed by the people”. Consequently, issues such as hydrogeological screenings for packaged water factory sites abstracting from the nation’s vulnerable ground water resources may not given the required technical attention.

Again as a public bureaucracy in a typical Nigerian civil service setting where favouritism rather than technical expertise are important considerations in recruitment (Yesufu, 1992; Jike, 2003; Otobo, 1992), promotion primarily on the basis of seniority (Okafor, 2005), on-the-job training weak and ineffective (Otobo, 1992) and dismissal due to inefficiency is rare (Adebayo, 2001) one might not expect so much in terms of service delivery aimed at public health protection from an altruistic viewpoint. Although under its new leadership, NAFDAC claims integrity issues as paramount to its success, moreover petty corruption such as the need to tip officials for expected services cannot be ruled out. This continues to flourish in most ministries and parastatals in Nigeria (Obiajulu, 2000). The possibility of having ‘special consultants’ (as

Figure 4. Regulatory model of Nigeria’s packaged water industry.
attested to by the manufacturers association) to hasten the certification process for some intending manufacturers and having them to pay up to thrice the normal value for certification fees could be indicative of this. On the other hand, with over 4,000 staff represented nationwide, NAFDAC has a staggering ratio of less than one staff per brand of packaged water covering the urban, periurban and rural complexities of the nation’s expanse of land. Consequently, surveillance has been hampered, remained passive and reduced merely to a reactive process: we cant be all out, how many staff do we have, the highest rate of consumption of packaged water is during the hot season so [to minimise cost and effort] that’s when we do our surveillance’...it is the consumers that should inform us when they drink bad [contaminated] water, we have our hotlines, tell us if your water is not pure’ (NAFDAC). Ironically, it is confirmed that in addition to issues related to improper handling and vertical transmission of pathogens, higher level of cross-contamination occurs during the rainy seasons (Egwari and Aboaba, 2002). Additionally, these hotlines are uncommon among the poor and those that are aware of faulty packaged water only change their brand choice and fail to report. What is the use of reporting when I put my life at risk and nothing is done about it (consumer).

Complacency of the nation’s law in terms of implementation and prosecution coupled with frail security build-up as confirmed by CAMON (2007) are major deterrents to such public outcry.

As with the regulator agency, a similar perception persists among the packaged manufacturers who apparently employ subjective treatment schemes and differing packaging materials leaving the consumers to ‘judge by tasting and buy the one they believe in’. Furthermore, batch specifications and recall plans address retrieval in the event of a production default are not taken as important by the manufacturers and are equally not enforced by the regulatory agency. Given this tactical deployment of the responsibility of drinking water assessment to the consumers by the regulatory agency and the manufacturers, the most probable outcome in an environment where the government again has not been efficient in maintaining public water sources could be a considerable state of confusion (Figure 5).

**Recommendations**

The suggested recommendations if suitably adapted promise great rewards in the effective regulation of the packaged water industry.

a) Packaged water companies in Nigeria should be encouraged to incorporate HACCP safety plans which should address hazard analysis of the plant’s processes and substantiation for each critical control point (CCP) in the packaged water process and the distribution system. Vending and distribution programs that affect the security of packaged water products outside the factory need be addressed too.

b) Beyond processing and packaging, the manufacturers...
should be encouraged to develop recall plans to address tracing and retrieval of product. Consequently, much more emphasis would have to be made on printing on batch numbers or date of manufacture on the sachet labels.

c) There is the need to fortify daily or weekly in-house total coliform monitoring on finished packaged water products through collaborative efforts with competent research laboratories in the nation.

d) In collaboration with other independent research agencies, manufacturers’ association and law enforcement agencies, manufacturers should be subjected to occasional, unannounced plant inspection demonstrating compliance with this code of practice.

e) The regulatory agency should prepare a scheme of preferred locations in the country rather than leaving the choice of treatment scheme to the manufacturers.

f) Beyond registration of intending manufacturers, regular call-ups by the regulatory agency for training activities on latest developments will help foster post-certification communications which seem to be missing between the two parties. It should be mandated for each packaged water factory to recruit at least two qualified personnel that will serve as liaison officers with the agency.

g) A final yet important note is the need for NAFDAC to organise intensive hygiene and sanitation programmes, if possible with certifications of attendance (or other carefully selected incentive) for distributors and vendors on handling and storage issues, these which are also critical to the fate of the packaged water product.

Conclusion

The task of effectively regulating the myriads of sachet water producers in the nation given the expanse of the land, inadequate staffing capabilities among others remains a big challenge to NAFDAC. Opportunities exist for improvements in the current regulatory scheme, institutional capacity and collaborative partnership that could make efficient the regulation of the packaged water industry and ultimately better the lot of the consuming public.

REFERENCES


