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# Facilitating the Adoption of Food-Safety Interventions in the Street-Food Sector and on Farms

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**Abstract**

This chapter discusses the implementation challenges of the WHO Guidelines on safe wastewater use pertaining to the adoption of the so-called 'post-treatment' or 'non-treatment' options, like safer irrigation practices or appropriate vegetable-washing in kitchens. Due to limited risk awareness and immediate benefits of wastewater irrigation, it is unlikely that a broad adoption of recommended practices will automatically follow revised policies or any educational campaign and training. Most of the recommended practices do not only require behaviour-change but might also increase operational costs. In such a situation, significant efforts are required to explore how conventional and/or social marketing can support the desired behaviour-change towards the adoption of safety practices. This will require new strategic partnerships and a new section in the WHO Guidelines. This chapter outlines the necessary steps and considerations for increasing the adoption probability, and suggests a framework which is based on a combination of social marketing, incentive systems, awareness creation/education and application of regulations. An important conclusion is that these steps require serious accompanying research of the target group, strongly involving social sciences, which should not be underestimated in related projects.

## INTRODUCTION

As African cities experience urbanization and globalization, they face development challenges coupled with cultural changes. Eating patterns, for example, tend to shift from traditional dishes towards fast food, often consisting of rice, poultry and salad, which is supplied by a booming but largely informal street-food sector providing employment and inexpensive food for urban dwellers (Maxwell et al., 2000; Nicolas et al., 2007; WHO, 2004).

The development challenges relate to the slow pace of urban infrastructure expansion, such as sanitation facilities, which results in widespread environmental pollution (Raschid-Sally and Jayakody, 2008). The street-food sector is especially affected, not only by the unsanitary operating conditions, but also by the quality of vegetables that are produced with highly contaminated surface water (Obuobie et al., 2006). The development of the sanitation sector in developing countries still faces a variety of challenges, hence time is needed before farmers and consumers can fully rely on wastewater treatment to safeguard water quality. As an interim measure, the WHO (2006) recognized that other options aside from or in addition to treatment of wastewater, such as on-farm water treatment, safer irrigation practices or careful vegetable-washing, can significantly contribute to health-risk reduction.

This focus on additional non- or post-treatment options can actually increase security through more diversified health-risk reduction control points (the 'multiple-barrier approach'). Farmers using polluted water, traders buying and selling contaminated crops and the private or commercial kitchens preparing raw salads play key roles in this system, which is based on the principles of hazard analysis and critical control points (HACCP) (Box 16.1). The challenge of the system is its successful application in a low-income, low-resource and low-education context, as typically found in sub-Saharan Africa, which shows the largest discrepancy between what is needed and what is experienced.

The main challenge in the food-safety sector is bridging the gap between theoretical approaches and their applicability on the field. Two basic areas of intervention are usually required: the first one is the provision of appropriate infrastructure (such as sanitary facilities in markets) and the second is behavioural change among the stakeholders of the critical control points identified for health-risk reduction. Whereas the provision of infrastructure offers a promising intervention area, the behavioural change of farmers, traders and consumers still constitutes a pristine research field in the context of 'wastewater irrigation', despite the fact that behaviour-change concepts are largely developed and have increasingly been applied in the sanitation and hygiene sector.

This chapter tries to outline a possible pathway to facilitate behaviour-change towards safer irrigation and food-handling practices, mostly drawing on the example of studies carried out by the International Water Management Institute (IWMI) with its partners in Ghana (see also Chapters 10, 12, 13 and 17). Methods

### Box 16.1 Hazard analysis and critical control point system

The management of microbiological hazards in the street-food sector builds on the use of tools such as quantitative microbial risk assessment (QMRA) and the HACCP system. Sound microbiological risk assessment provides an understanding of the nature of the hazard and is a tool to set priorities for targeted interventions at critical control points along the value chain of, for example, vegetables eaten raw.

Related strategies for improving street-food safety should be based upon studies of the local street-food system and may include consideration of:

- policy, regulation, registration and licenses;
- infrastructure, services and vending-unit design and construction;
- training of food-handlers;
- education of consumers.

*Source:* WHO (1996, 2002)

used to analyse options for triggering a behaviour-change include literature surveys, expert interviews, street surveys, focus group discussions, observations, training sessions and a variety of knowledge sharing activities (Amoah et al., 2009; Karg, 2008; Keraita et al., 2008).

The approach used was highly iterative between empirical and conceptual perspectives. The groups targeted for behaviour-change in Ghana were: farmers (who induce most crop contamination through the use of highly polluted water); and restaurants, in particular street-food restaurants, where more than 90 per cent of the wastewater-irrigated salad crops are served (Amoah et al., 2007a, 2007b).

## Changing approaches to understand behaviour-change

In the past, many health-promotion campaigns were based on educating people about the threat of disease in order to change their behaviours (Nutbeam and Harris, 2004). However, there is little evidence that approaches based on health education have had the anticipated impact, in particular in developing countries (Burgers and Boot, 1988; Scott et al., 2007). Some programme evaluations show that knowledge has indeed increased but without resulting in behaviour-change (Favin et al., 2004). The reasons might be many, including that 'old habits die hard', especially if the benefits are not immediately visible or if they are only of indirect concern. In addition, the manner of conveying an educational message can steer its success or failure, especially if it does not match local perceptions and

(risk) knowledge (Martinsen, 2008). For example, food-safety posters developed in the USA used symbols for bacteria and slogans, like 'fight bac' which the focus groups under study in Ghana did not understand.

New knowledge does not instantly result in new practices as they might be too difficult, too expensive, too time-consuming, or be opposed by other people (UNICEF and LSHTM, 1999). For interventions to be successful, and this extends also to the promotion of interventions, it is important to investigate the target groups' knowledge and perceptions beforehand.

## Perceptions of clean, safe and dirty

Curtis (1988) has underlined the importance of recognizing the strong social dimensions of hygiene in developing countries. Hygiene and related risk assessment are thus approached as social phenomena based upon culturally determined ideas. Dirt-avoidance was a desirable behaviour long before the discovery of bacterial disease transmission, thus hygiene is not only about the removal of germs (Curtis, 1988). Similar findings are documented in the work of van der Geest (1998), an anthropologist who found that, in Ghana, dirt is seen as much more than a potential health risk and can be equally perceived as physical and moral decay, whereas cleanliness stands for physical and moral attractiveness – in Ghanaian English cleanliness is often referred to as 'neatness', a term indeed often appearing in local street-food surveys.

Perception studies in Ghana targeted farmers and staff of street restaurants to gain a better understanding of opportunities and constraints for behaviour-change (Box 16.2) (Karg, 2008; Keraita et al., 2008; Rheinländer et al., 2008). Such participatory studies with the target group (see also Chapter 17) are an important step to understanding what could facilitate the adoption of innovations (Chambers et al., 1989).

### Box 16.2 Perceptions of street-food safety in urban Kumasi, Ghana

Although both vendors and consumers demonstrated basic knowledge of food safety, the food-quality (including safety) criteria used by the two groups did not emphasize basic hygiene practices such as handwashing, cleaning of utensils, washing of raw vegetables and efficacy of disinfectants. Instead, the main food-selection criteria related to: aesthetic appearance of the food and food stand; appearance of the food vendor; interpersonal trust in the vendor; and price and accessibility of food (Probst, 2008; Rheinländer et al., 2008). However, it was also observed that pressure on vendors to improve the clean appearance of vegetables can result in a prompt response (Drechsel et al., 2000).

## Triggering behaviour-change

If behaviour-change, i.e. the adoption of recommended practices, is the target, one must understand which internal or external factors in the local context might trigger or hinder it. A supporting internal factor can be increased awareness about health risks. A supporting external factor can be a credit programme or enforced regulations and controls. The fact that it is hard to shed old habits certainly poses a significant internal barrier. Other barriers are the investments required or potential losses. Some safer irrigation practices, like furrow or drip irrigation, might reduce cropping density and yields. Similarly, the cessation of irrigation, even if only for two or three days, can reduce yields as the hot weather in Ghana calls for daily watering (Drechsel et al., 2008). Also more effective vegetable-washing in kitchens would require some investments in, for instance, bleach or chlorine tablets, so there may be a cost restraint.

In short, several of the recommended non-treatment or post-treatment practices to increase the safety of wastewater-irrigated vegetables require extra efforts or inputs without a tangible direct benefit unless consumers pay more for safe produce. However, although there is a general demand for safe food, the risk awareness is too low to stimulate any significant willingness to pay (Box 16.3).

### Box 16.3 Willingness to pay for safer vegetables

In an accompanying FAO-IWMI-supported study in Ghana's major cities of Accra and Kumasi, the willingness to pay (WTP) for safer vegetables was explored, based on a sample of 300 individual consumers purchasing food with green salads or green salad alone from roadside food vendors and restaurants.

The results indicate a monthly average income of about US$280 of which US$5.50 is spent on the salad component. About 95 per cent of the sampled consumers are willing to pay for safer salads. However, the additional amounts are low. Extrapolated for the month, the consumer is willing to pay about US$0.40 more, a figure which varied to some extent with age, income and related educational level, and is slightly lower than the 10 per cent increase reported from a similar study in Vietnam (Simmons and Scott, 2007).

*Source:* Yahaya and Kinane (2009)

In such a situation, social marketing options should be explored to catalyse behaviour-change. While commercial marketing ultimately seeks to generate profit for a private interest, social marketing seeks to influence a target audience to voluntarily accept, modify or abandon behaviour for the benefit of individuals, groups or society as a whole. The social marketing approach applies commercial

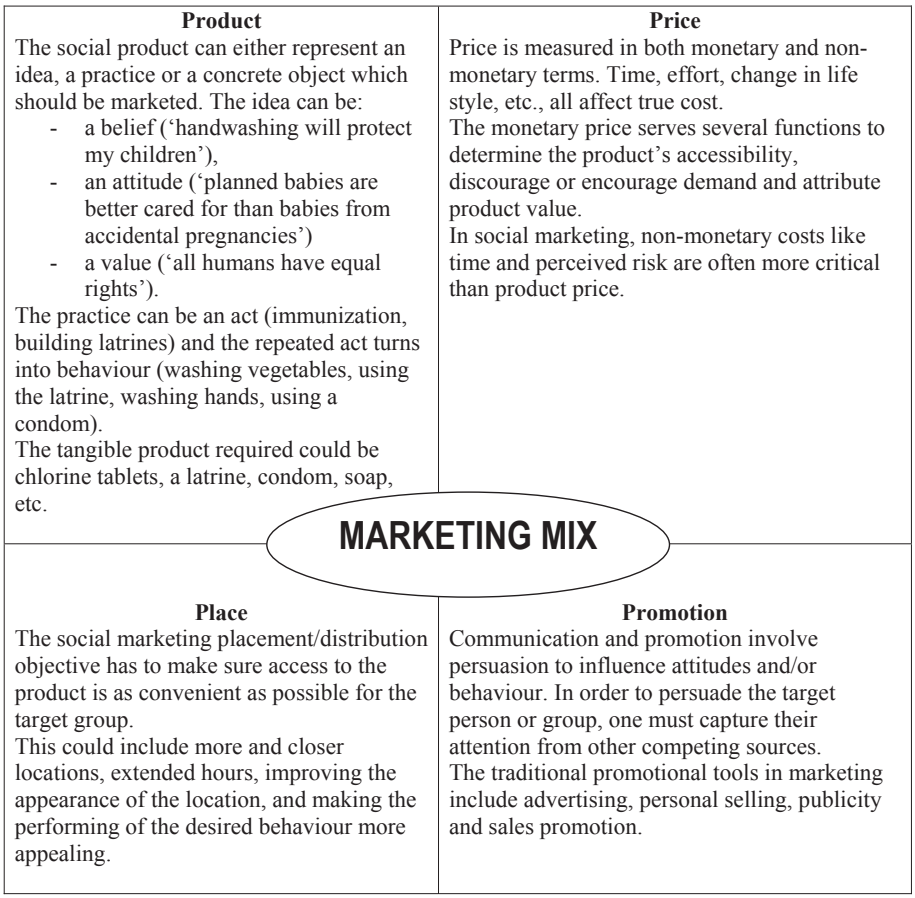


**Figure 16.1** *Description of the four 'Ps' when used in social marketing*

*Source:* Martinsen (2008)

marketing principles and techniques, such as customer orientation, marketing research, and the use of the marketing mix (Figure 16.1). The concept has been tested in the sanitation sector as well as in public health (Grier and Bryant, 2005; Martinsen, 2008; Siegel and Doner Lotenberg, 2007).

Marketing approaches in general are considered a promising alternative to traditional (educational) approaches to change people's behaviours, i.e. instead of being supply driven (providing knowledge and materials), marketing approaches support a demand-driven change, thus are more consumer-oriented.

In the Ghana case, farmers might eventually change their behaviour for other, also intangible incentives, like less pressure from authorities and the media that their current practices are bad for public health (Box 16.4). Also greater tenure security could facilitate, for example, investments in on-farm treatment ponds.

### Box 16.4 Incentive options discussed in the Ghana study

- Awards and public recognition might be possible incentives for behaviour-change, especially where farmers are harassed by media and officials about wastewater use. Farmers with safe produce could get recognition during 'Best Farmer' celebrations. Fast-food stands adopting an integrated safe-food concept might get recognized in tourist guides.
- Incentives from government agencies for farmers participating in safety schemes could be the provision of extra training, support of more dedicated extension services trained in food safety, loans (micro-credit), subsidies for pumps, and/or tenure security, which farmers ranked very high (see Chapter 17).
- A market incentive could be a certification programme (Goewie, 2002) for 'safer crops' combined with dedicated marketing channels to hotels, restaurants and supermarkets, accessible at least to customers with a higher willingness to pay for safer produce. Ideally, this should also support independent monitoring of the quality standard. To bring this to the advantage of the wider public requires more awareness creation to increase the general demand for safer crops.

In Vietnam, farmers could apply for financial support if they were interested in growing safe vegetables. They were asked to pay 80 per cent back when they returned a profit (Simmons and Scott, 2007).

In many cases, supporting a desired behaviour-change alone is not enough because at the same time the current alternative to the suggested practice needs to be fought. Thus, the most effective approach might be a mix of incentives and disincentives.

## Need for applied research

The important part of both commercial marketing and social marketing is to identify the conditions that can make one and/or the other work. In the case of wastewater and food safety, this means analysing:

- whether safer practices would directly pay off by either improving production or reducing production costs;
- whether safer practices would eventually pay off due to an increased willingness-to-pay by consumers and traders;
- whether there are other triggers and incentives which could change behaviour and how best to instigate and build on them, while avoiding change barriers.

While the first two studies require conventional economic analysis (farm cost–benefit analysis, contingent valuation), the third study stretches most projects

even further out of their comfort zone. It requires substantial social analysis of the constraints and opportunities of the target group, their perceptions, wants and attitudes (Andreasen, 1995). The reasons for a person not to change his/her practice can be numerous and of different weight, linked to tradition, family pressure, community norms, time pressure, inconvenience and so on: the reason is not always necessarily a lack of awareness of the social or health benefits of adopting the practice promoted. This analysis requires good listening skills and should be based on participatory research principles.

Aside from understanding the reasons that might limit behaviour-change, it will require a different effort to analyse what might trigger it. Trigger studies will have to consider distinct population subgroups and the social and cultural environments in which the people act. This information is used to make strategic marketing decisions about segments of the target group in terms of what benefits to offer and about how to price, place and promote products (Grier and Bryant, 2005).

The planning process based on findings delivered by applied research can be outlined in the following steps:

- Assess current food handling behaviours related to the problem(s) of concern.
- Identify feasible options for change which reduce health risks.
- Identify barriers and enabling factors (external and internal triggers) for a related behaviour-change and verify them with the target group(s).
- Study appropriate communication channels and (form of) outreach messages.
- Carefully consider which stakeholders and policy-makers will be crucial in developing, promoting and implementing effective change strategies.

Although, ideally, all aspects of food safety and hygiene should be promoted, it is recognized that hygiene-promotion programmes work best if they focus on a small number of activities and easy-to-recall messages. However, it must be borne in mind that by promoting a single practice, such as vegetable-washing, people might assume that this practice alone can prevent the spread of infection leading to an 'illusion of risk-control' (Bloomfield, 2003; Knox, 2000). Moreover, if the emphasis is placed on effective vegetable-washing alone, and handwashing or cross-contamination are ignored, it is questionable whether a campaign can achieve any significant or measurable health impact. Ideally, both effective vegetable-washing and other basic food-safety practices should be part of an integrated behaviour-change campaign.[1] Even if not all components of a 'package' will be adopted, the costs of promoting a package of maybe two to three good practices might only be marginally higher than for one practice, while multiplying its potential impact. To find the most appropriate break-even point considering cost-effectiveness and message absorption capacity of the target group, is certainly a challenge.[2]

The street-food survey in Ghana revealed a number of external and internal behaviour determinants towards adoption of better food-safety practices. Following the example from Favin et al. (2004), barriers and enabling factors were sorted according to different categories to help in formulating possible intervention strategies (Tables 16.1, 16.2).

## Campaign framework

The study conducted in Ghana led to the development of a framework for implementing a (so far not funded) national campaign on food safety with special emphasis on wastewater-irrigated vegetables (IWMI, 2009). The framework combined different elements or strategies considered as important for changing behaviour in the street-food sector and among farmers. It draws on Tables 16.1 and 16.2 and the 'Receptivity Model' described by Jeffrey and Seaton (2004) and emphasizes the equal importance of different measures to facilitate behaviour changes and increase food safety. The framework also considers the benefit of simultaneously using incentives (for behaviour-change) and disincentives (for maintaining the old behaviour), for example via enforced regulations and fees. The elements of the framework are:

- education (given the low educational level);
- social marketing (given the low commercial incentive for changing behaviour);
- incentives (transforming needs of the target group into opportunities);
- regulations (to address bad practices and institutionalize good ones).

### Education

Education or knowledge transfer by themselves might not change behaviour, as mentioned above, but remain crucial components of any multi-strategy approach, especially if they avoid top-down lecturing. When considering knowledge as a driver for behavioural change (or lack of knowledge as a barrier to change), it is important to recognize that there are two types of knowledge. The first – practical or logistical knowledge – is essential for adapting new behaviours (e.g. how to prepare the correct chlorine solution for disinfecting vegetables). The second type of knowledge, the scientific explanation of the reasons why the behaviour-change is important (e.g. how the chlorine works), may not be essential to achieve behaviour-change as experienced in the Ghana hand-wash campaign (Box 16.5).

### Social marketing

Social marketing is an important tool where economic arguments do not work. Even if health considerations are not valued highly in the target group, social

**Table 16.1** *External behaviour determinants and possible intervention strategies in Ghana's informal street restaurant sector*

| Category | Barriers (-) | Enabling factors (+) | Possible response strategy |
|---|---|---|---|
| Input supply | Effective disinfectants are generally not known, although available. Thus vegetable-washing is not effectively reducing pathogens. | Vegetable-washing to remove dirt is done by over 90% of stakeholders; this is an excellent starting point for effective pathogen removal. | Promote available disinfectants (bleach, chlorine tablets, potassium permanganate) suitable for different classes of restaurants. |
| Socio-economic conditions | Vendors are concerned about costs of required inputs or training. | Public and private sector offer free training. Some ingredients (bleach) are very cheap. | Make options known. Engage private sector for promotion and subsidies. Training certificates might increase sales. |
| Education | In catering schools practical food safety does not get much attention. | Teaching materials are being provided/revised based on current project results. | Establish early link with educational sector to facilitate adoption of results in curricula. |
| Environmental conditions | The environment of street restaurants is in general unsafe; water and toilets might be missing. | | Interventions have to consider local possibilities and limitations and aim at step-wise improvements. |
| Institutional settings | Regulating authorities are under-resourced, which might facilitate corruption. | Authorities are in place. | Interventions cannot rely on enforcement or control catalysing behaviour-change. Institutional capacity building component required. |
| Social groupings | Few members in catering associations due to internal problems. Most associations have weak governance and funding. | Social clubs, church groups and professional associations are common and can be used as possible communication channels. In general, vendors like to join associations and networks. | Associations should be strengthened and memberships promoted. Allow loan schemes/credit for safer behaviour. |
| Vendor/ customer interaction | Customers are more concerned about price, neatness and quantity of the food, rather than food safety. | Customers have much influence over the vendor. Vendors are willing to learn to please customers. | Customers' awareness about food-safety issues has to be increased. |
| Neatness as part of cultural norms | Neatness is important but does not necessarily include cleanliness and safe food. | Controllers, vendors and customers are very concerned about neatness which is closely associated with trust and respect. | The term neatness has to be extended to visible and invisible cleanliness; or positively linked to disinfectants. |
| Cultural norms | Customers are reluctant to make direct inquiries about food origin related to safety which is considered disrespectful. | Food origin can be a 'brand'; e.g. carrots from Togo are preferred to Ghanaian ones. | Safer production sites could get a brand name associated with accepted norms, such as 'clean' and 'tasty'. |

**Table 16.2** *Internal behaviour determinants and possible intervention strategies in Ghana's informal street restaurant sector*

| Category | Barriers (-) | Enabling factors (+) | Possible response strategy |
|---|---|---|---|
| Risk awareness | Vendors do not perceive any elevated risk and consider current washing practices to be appropriate. | Vendors are to different degrees aware of health risks related to raw vegetables. | Risks should be explained. Invisible risks should be made 'visible' (see e.g. Amoah et al., 2009). |
| Scientific knowledge | Very little awareness of invisible risks (micro-organisms) and pathogen pathways. | High awareness of visible risks like insects and knowledge of the term 'germs'. | Risks should be explained. Invisible risks should be made 'visible' (see e.g. Amoah et al., 2009). |
| Practical knowledge | Few attended formal catering education in schools. Effective vegetable-washing methods are in most cases not known. | Vendors have basic knowledge of food safety through post-school training provided by projects or private sector. | Promotion of effective methods in workshops, through associations and private-sector training. |
| Emotions and reactions | Promotional materials and campaigns as used in other cultures do not appeal necessarily and might even be misleading if unknown symbols or vocabulary are used. | Perception studies point at positive and negative motivational factors which drive hygiene behaviour. | Strategy should be based on local knowledge and perceptions. |
| Intention | | In general, vendors are very willing to learn about clean food preparation. | Training workshops can be combined with cooking courses or private-sector product promotions |

marketing studies can help to identify related benefits that are valued, including indirect business advantages, improved self-esteem, a feeling of comfort or respect for others. Studies thus have to look for 'positive (core) values' that the primary target audience associates or could associate with the innovation (Siegel and Doner Lotenberg, 2007). For example, if using a drip kit for safer irrigation is valued for reasons of feeling 'technologically advanced', then the social marketing messages and communication strategies should reinforce this existing positive association.

## Incentives

Incentives are important when the benefits are not direct, such as when individual action (safer irrigation practices) serves society (public health) more than the actor. In the hand-washing case (Box 16.5), the benefit was for the person and for the family, i.e. a much closer association than for a farmer who is not the consumer

### Box 16.5 Social marketing studies in the West African context

#### 'Health in your hands'

A marketing approach was applied in a nationwide hand-washing campaign in Ghana ('Health in your hands').[3] This approach involved the use of professional marketing techniques facilitated through a private–public partnership to promote 'socially useful products' (in this case, hand-washing with soap) through generation of demand. The underlying research revealed two main drivers for hand-washing with soap: disgust of dirt (yuck factor) and caring for a child, whereas protection from disease was not regarded as a key motivator. The communication campaign was thus designed in such a way as to evoke the feeling of disgust without mentioning health reasons or sickness. The campaign was fairly successful: soap use after toilet use increased by 13 per cent and soap use before eating went up 41 per cent (Curtis, 2002; Duhigg, 2008; Scott et al., 2007).

#### 'A wanted latrine is a used latrine'

In Benin the social marketing approach was applied to improve sanitation. Previous sanitation projects in developing countries often failed because they relied only on subsidized latrine construction and health education without generating demand; and the target community did not change established habits (like open defecation), thus the latrines remained unused. In the Benin case, research was conducted to find out what triggers people to invest in a latrine and to use it. Health benefits did not appear in the top ten triggers whereas safety, dignity and prestige were among the top five (Martinsen, 2008).

of his/her crops. In the case of the farmer, the need for extra incentives is likely (Box 16.4). Customer–vendor interactions have been identified as an important element influencing food-safety issues, both as an impedimental factor upholding the current situation (low risk awareness) and as a potential source of improvement (if awareness has been created) (see Box 16.2).

## Regulations

Regulations are required to institutionalize new food-safety recommendations. When enforced these provide the legal framework for both incentives, such as certificates, and disincentives, like fees. New rules usually also require capacity building. In order to integrate improved food-handling practices into institutional structures, inspection forms can be updated, inspectors/extension officers can be trained and pressure can be applied to caterers in the form of punitive fees and, in the extreme case, business closure. However, regulations should not be based

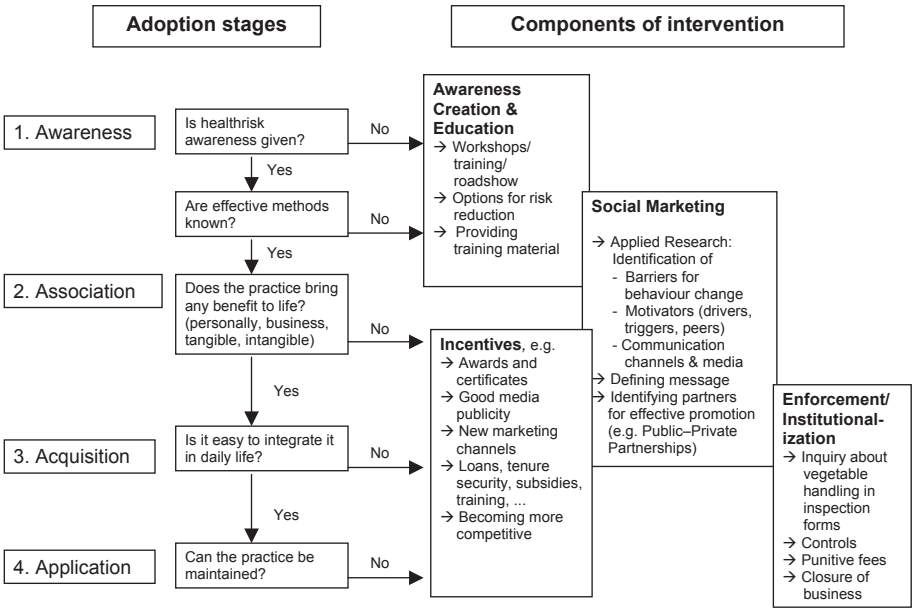


**Figure 16.2** *Suggested multi-strategy campaign framework for the adoption of non-treatment interventions, on farm and off farm, for the reduction of health risks from wastewater irrigation in urban Ghana*

*Source:* After Roma and Jeffrey (2008), modified by Karg (2008)

on imported (theoretical) standards but locally feasible standards as otherwise they have no practical application value and can facilitate corruption. In this way, regulation and institutionalization may contribute to ensuring the long-term sustainability of behaviour-change whereas promotional and educational activities are usually limited to a specific time frame.

## Application

According to different individual stages of behaviour-change from the initial awareness to association, acquisition and finally application (Figure 16.2), some components of the campaign might be more suitable for some individuals or groups than others, while in general they complement each other. An analysis assuming different adoption rates showed the potential of the suggested campaign framework, and also its cost-effectiveness (see Chapter 13). Whether the framework has advantages compared to other possible strategies for behaviour-change towards increased food safety remains to be studied.

## Conclusions

The WHO Guidelines (2006) for safe wastewater irrigation recommend intersectoral collaboration, policy dialogue and policy formulation as key elements for their implementation. This is indeed necessary but not sufficient where safeguarding health cannot rely just on wastewater treatment. Implementing the guidelines in this situation means first of all that certain actors along the pathogen pathway have to change their behaviour. Improved policies and related education might be milestones but often do not trigger behaviour-change. This situation calls for a stronger integration of social science research in the strongholds of engineering and epidemiology to address key adoption barriers, such as:

- Recommended practices for increased food safety do not in most cases provide direct profit or reduce production costs (they may even be more expensive).
- Educational levels in developing countries are too low to understand public-health risks and related responsibility.
- Safety regulations are often too theoretical and do not fit local capacities or context.

In addition to educational and regulatory efforts, conventional and social marketing can play a significant role in understanding and facilitating behaviour-change although neither concept is without challenges (Biran and Hagard, 2003; Cave and Curtis, 1999). To be successful, social marketing requires applied research to understand the needs, aspirations, values and everyday lives of the target audiences, and their perceptions of factors which might motivate or discourage them from adopting recommended technologies. This research will greatly help in designing a well-targeted food-safety campaign under any policy supporting the WHO Guidelines in the farm and post-harvest sectors.

## Notes

1 There can be large differences between countries and cultures. In Francophone West Africa, very effective (e.g. bleach-based) vegetable-washing practices are common, while in Ghana this is not the case (Amoah et al., 2007b).
2 The size of the package or length of the message also has implications on the media to be used as TV spots, for example, are rather expensive and thus only allow short messages.
3 This campaign was developed by the 'Global Public Private Partnership on Handwashing' (www.globalhandwashing.org).

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