07 Conclusion and concerns

While the proposed ideas above are in general applicable to any country, special attention should be paid to the context of developing countries, as follows.

First, many developing countries are limited in terms of budgetary constraints, which means that conducting statistically relevant social surveys can be quite a challenge. As stated in table 2, in order to set a baseline and to continue comparative surveys, securing the necessary budget and **"awareness" of governmental officials** is important.

Second, the **"capacities" of either the public officials or non-governmental staff conducting surveys and subsequent statistical analysis of the collected data** are crucial in determining the state of public awareness and actions. In particular, those with strong public relations skills (i.e., local officials and field-oriented NGO staff) are needed. In such context, social surveys conducted jointly by local government and local or foreign universities or research institutes would link governments with academia and enable coordination with experts in carrying out surveys.

Third, **gradual steps or a "tiered approach"** would be useful in gauging public awareness, as achieving all desirable qualifications (e.g., number of questions and size of respondents) in one go could represent quite a challenge due to the many constraints and uncertainty factors which could hinder the measurement process. Thus, developing this process in incremental steps would assist in monitoring public awareness over the long term. If the collection of data and information are the end rather than the means, then this squanders whatever resources are available.

Fourth, **data and information collection processes for gauging public awareness should not be understood as a goal; they should only be used as tools underpinning goals or in decision-making processes**, i.e., to improve performance of the 3Rs. If the process becomes routine and the collected data and information are misused or underused then all inputs and efforts may be in vain and the corresponding loss in opportunity (i.e., that which could have been gained for other purposes if budget was allocated to efforts for collection) is substantial, especially in developing countries. In respect of information per se, it is crucial to bear in mind the maxim *no use, no value*. See Abe, Morizumi, and Sasaki (2012) on the utilisation of air quality information in Japan, which underscores this point.

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Ministry of the Environment

3R Policy Indicators Factsheets Series

Measuring Public Awareness and Actions for 3Rs

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01 Background

Public awareness of appropriate solid waste management practices (3Rs; Reduce, Reuse, Recycle) is the starting point for and fundamental ingredient of a sound material-cycle and resource-efficient society. Public awareness forms the basis of public capacity, which enables the public to undertake actual actions of each element of the 3Rs. Such actions consequently become the inputs for the advancement or "performance" of 3Rs for a sound material-cycle society.

Central and local governments, environmental NGOs, entrepreneurs, mass-media, and others all influence public awareness through their policies, practices and operations, which as a whole leads to "capacity development", as portrayed in figure 1. How public awareness and the related actions can be increased forms the focus of this factsheet.

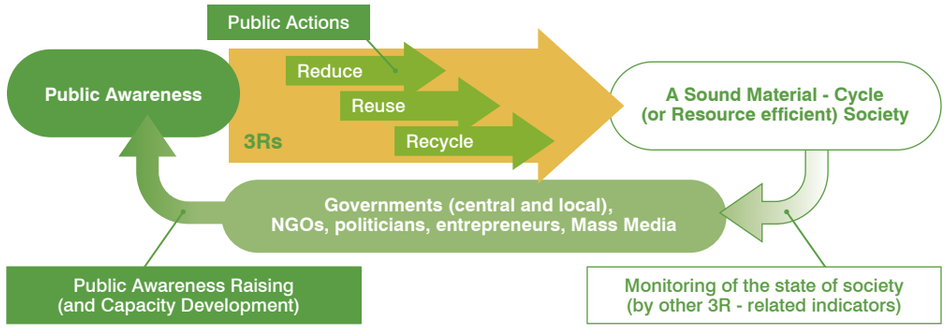

Figure 1. Schematic diagram showing interrelationship of public awareness and actions

Factsheets Series on 3R Policy Indicators
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02 Definition

This factsheet uses following definitions:*

Public - all individuals within society: ordinary citizens, state and municipal government officials, politicians, NGO staff, business executives and employees, including small and medium enterprise (SMEs) owners (see figure 2). In order to discuss "awareness", we cannot exclude any individuals who have opinions on the environment—all opinions count.

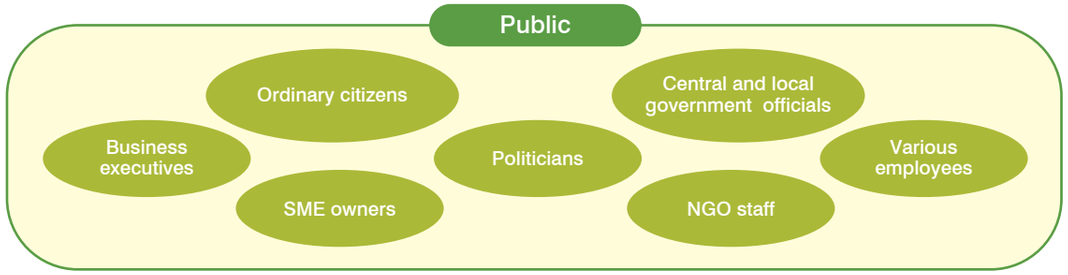

Figure 2. Scope of the term "the public"

In order to define "Public Awareness", it is useful to define other related terms. And while such terms may also very in meaning, the following are applied in this material. In particular, in light of proposed Goal 19, which broadly states public awareness as to "[R]aise public awareness on the 3Rs, sustainable production and consumption, and resource efficiency, leading to the behavioural change of the citizens", we go one step further in elaborating on this definition; see figure 3.

Public Awareness – acquired knowledge and concerns of individuals concerning 3Rs, sustainable production and consumption, and resource efficiency.

Public Knowledge – acquired experience and basic understanding of individuals concerning 3Rs, sustainable production and consumption, and resource efficiency.

Public Attitude – acquired values, expression of concern and interests, and motivation of individuals for actions concerning 3Rs, sustainable production and consumption, and resource efficiency.

Public Action – actions taken by individuals in regards to their behaviours, consumption choices, and lifestyle practices to accommodate or support 3Rs, sustainable production and consumption, and resource efficiency.

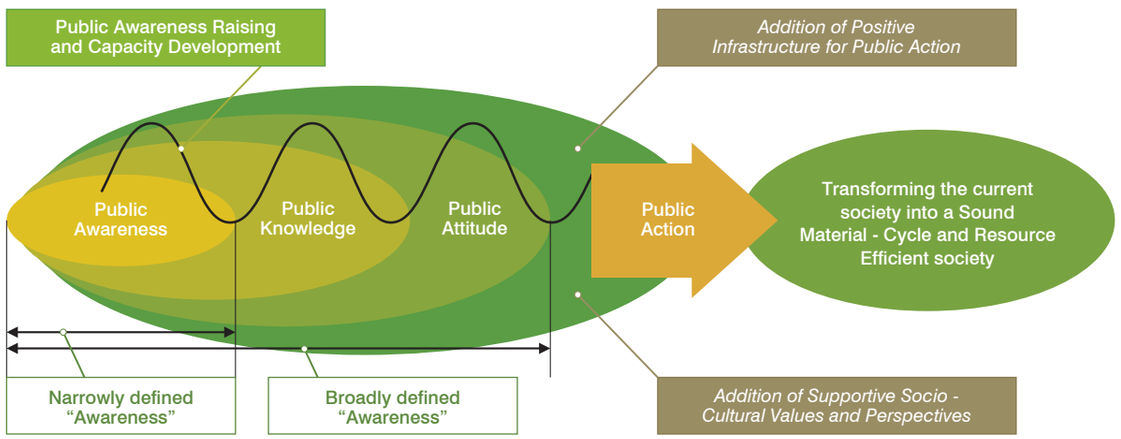

Figure 3. Hierarchy of "Awareness"

* The difference between 'public actions' and 'public participation' needs commenting on; while public actions are civic responses against certain external stimuli concerning the 3Rs, public participation usually refers to citizen engagement in governmental decision-making, policy formation, and planning processes. Public participation is a highly sensitive concept in politics, as there are many forms of participation, ranging from public comments to active planning methodologies, and from the less legitimate to the more legitimate (i.e., Arnstein's Ladder of Citizen Participation).

effective level). Potentially for appropriate interventions, a certain amount of interplay between awareness inputs (see indicators in section 6) and knowledge gain (as the social survey provides) to identify what is and is not working with a given awareness raising approach would be beneficial. If only a social survey is used, then in effect we can only glean information on awareness raising but not on practice and achievement. While household performance indicators demonstrate practice and achievement, but do not allow extrapolation of cause and effect.

Statistically speaking, random sampling is always a central concern and hurdle for researchers in terms of extrapolating meaning from statistics as it involves questions of legitimacy of representation in terms of characteristics of populations related to the question on what we want to know or measure. Practically speaking, conducting a strictly random sample without due attention to this point can be highly challenging. At the same time, it is important to note that a social survey need not solely be statistical and quantitative in nature and can be qualitative. This returns us to the central question as to what exactly it is that we want to know or measure.

06 Significance of Public Awareness Raising practices

Since the level or state of public awareness is critical in the context of the 3Rs, central or local government officials, NGOs staff, or private sector executives, will naturally need to consider how the level of the awareness of individuals can actually be raised. To this end, it would be helpful to lay out several possible measurement indicators, as exemplified below:

- **Number of existing programmes for 3Rs at local and national levels**
- **Number of NGOs or civic organisations which are active in 3R promotion**
- **Number of awareness raising events held**
- **Number participants in such events**
- **Number (or frequency) of awareness raising materials distributed**
- **Number of schools conducting environmental education**

Unfortunately, there are no objectively perfect or 'correct' measurement indicators. Used on their own these indicators do not "indicate" anything; they should be used together with a clear vision, plan, as well as leadership of how 3Rs can work and contribute to a community and beyond. In a simple conceptual formula, the significance of public awareness raising should be shown as in Equation 1. As it implies, any efforts without substantial commitment by the corresponding action initiator would only result in marginal effects. See [Box. 1] as an example of public awareness raising.

Signifiance of public awarenss raising
=
{Value of an appropriat e indicator to measure the magnitude of awareness raising activites}
×
{1 if there is a clear visi on or plan of what 3R policy aims to achieve; otherwise 0}
×
{1 if there is clear linkage of how awarenss raising is related to 3R plan; otherwise 0}
×
{1 if there is clear leadership to implement 3R policy; otherwise 0}

... (Equation 1)

Box. 1 An example of Public Awareness raising: a case of Nagoya city, Japan

The city of Nagoya, with a population of about 2.27 million (2012; fourth largest city in Japan), is located in the centre of Japan. In the 1990s it faced a serious challenge in the operation of a final landfill site. It was estimated that the city's sole landfill site would be full by the year 2000. As a solution, the city planned to construct a new landfill site on the coastal area owned by the city. The proposed construction site was a wetland—a rich feeding ground for migrating birds known as "Fujimae-wetland", which later became a designated site under the Ramsar Convention in 2003. Several environmental NGOs and many citizens recognised the importance and the value of the wetland and strongly opposed construction of the new landfill site, despite the presence of the serious waste situation.

Eventually, in 1999, the city abandoned its construction plans, which left a crisis management situation for the city mayor, who was faced with the need to dramatically reduce the amounts of municipal solid waste sent to the existing landfill site and extend the life thereof to the extent possible. For that purpose, the city adopted a new and drastic waste management policy, including very detailed separation of waste for recycling. Concurrently, the city conducted a number of public campaigns and sessions to explain the reasoning behind the radically new waste policy and what the city was trying to achieve. The brevity of the city's efforts, taken together with that of the various NGOs and highly motivated citizen to mobilise the city toward a new waste management policy is a good example of public awareness raising actions. For more information, see Okayama (2007) or Barrett (2008).

Public Awareness Raising – providing information and knowledge to individuals to increase their awareness of an important social issue (i.e., 3Rs) and how they can take positive actions to address this issue; usually conducted by governments, NGOs, civic organisations, or private firms.

In Figure 3, an ideal conception of Public Awareness Raising activities is presented that moves beyond a narrowly defined understanding of public awareness towards a complex and dynamic understanding that conceptualizes public awareness (knowing a subject) as part of a continuum which also includes public knowledge (understanding the subject), attitude (acquiring the values, concerns, and motivation about the subject) and action (taking actions that contribute to the subject). This can contribute to the transformation of the current society into a Sound Material-Cycle and Resource Efficient society by acknowledging the progressive movement towards enabling public action. However, it must be acknowledged there are also several external factors that influence progress along this continuum, and as such increased public awareness and attitudes are not always sufficient to result in the desired public action. A wider perspective is necessary to consider how external factors including the existence of a good infrastructure for positive practice and supportive socio-cultural trends and perspectives also strongly influence the achievement of public action, with the key purpose of integrating both the internal and external factors into a holistic impact strategy.

03 Targets of measurement

The target of measurement for Public Awareness and Actions are defined as shown in table 1. Sometimes the distinction between Public Awareness and Public Actions may be ambiguous; for example, implementation of environmental or 3R educational programmes at an elementary school can be regarded as "Public Actions" while the action can also be regarded as realising Public Awareness; Institutional intention as a school.

Public Awareness	Public Actions
Public **knowledge** concerning 3Rs, Resource Efficiency, or environment. If we broadly defined Public Awareness, then the term covers not only knowledge but also **experience, understanding, and motivation** on 3Rs, Resource Efficiency, or environment in general. >> See figure 3	**Practices or actions** by individuals, governments, private firms, civic organisations, and entrepreneurs, etc., towards Reduce, Reuse, Recycle (3Rs). Various forms of 3R activities are possible.

Table 1. Measurement Targets of Public Awareness and Actions
(Source: authors)

In the context of developing countries, awareness of central and local government officials and the owners of SMEs are particularly important.

04 Methods of measurement

For the methods of measurement of Public Awareness or Public Actions, a summary is given in table 2. Data collection requires access to individuals and actions on-site. For this purpose, a questionnaire can be distributed to potential respondents. Having considered several conditions in developing countries, **a face-to-face survey with a structured questionnaire** is the most realistic and effective, but also costly. To this end, the survey staff actually making contact with respondents should be well-trained as they need to maintain consistency as regards to how they explain and raise questions. The use of visual materials such as photos or videos, to explain the 3Rs would help respondents comprehend questions in the survey.

The format of survey questions can be one that simply poses dichotomous questions (i.e., answerable with yes or no) or measures how conversant a respondent is on a certain subject based on questions employing the Likert-type scale response (on a scale of 1 to 5). For example, if you want to know how often a respondent follows the waste separation rule, apply the Likert-type scale shown in figure 4:

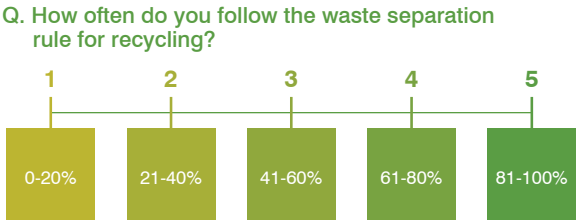

Figure 4. An example of a Likert-type question and response

As another example, the question could be: "Could you please list the main individual categories for household waste separation?" If the given locality using this question has five categories for waste separation, then answers can be scored based on what percentage of the categories respondents can identify.

Generally, for survey and questionnaire research investigating public awareness, knowledge and attitudes, it is considered best practice to always have at least one additional question, framed slightly differently, that cross-checks the answer of the original question. For example, the question "How often you follow waste separation" could be cross-checked by a Yes or No question such as: "Do you regularly practice recycling and waste separation?"

Public Awareness	Public Actions
Social Survey – questioning of public knowledge and attitudes on primary areas. Responses should be recognised as subjective judgements of the respondents. It is essential to pilot the survey in advance of full-scale application in order to check whether or not a questionnaire is appropriate and to tweak the format. Do not underestimate the time and effort involved in designing an appropriate questionnaire format. **A baseline survey** is important, which allows monitoring of the progress or change over time. It is also possible to conduct simple knowledge surveys before and after specific awareness-raising events in order to evaluate the direct benefits of a given initiative. **"Do you know" type questions** can be used to measure awareness. By raising several questions, we can identify the extent of knowledge (or percentage) concerning the 3Rs. You may want to attribute one point for a single question if an individual says "Yes, I know" and total the points for each person. **Scale of 5 Likert-type questions** can be used to measure knowledge and attitudes. Dichotomous questions (i.e., answerable with Yes or No) are also possible. In such case, "if yes, why"-type questions should follow to obtain supporting information to reveal what interventions are most needed for making future improvements to the system. Examples of surveys of Public Awareness by the European Environment Agency, International Union for Conservation of Nature (IUCN), Department of Conservation New Zealand, and Ministry of Environment Japan appear in the reference list. It is important to note that the questions in the examples are sometimes not only about narrowly defined "awareness" but also about attitudes and actions (i.e., broadly defined "awareness"). For details on survey design, for example, see King, Keohane, and Verba (1994) and Groves, Fowler, Couper, et al. (2009).	**Indicators** can be: **- Number of households composting their own garden waste** **- Amount of material sent to municipal composting** **- Number of categories of waste for separation** **- Total reduction amount of Household Waste** **- Total amount of recycled waste** **- Number of NGOs which are active in 3Rs** **- Number of schools where environmental education for 3Rs is conducted** **- Number of shops which support 3Rs activities in a locality** These figures can be obtained through either using existing statistics or actually observing such actions in-situ. Given the fact that environmental statistics are less often collected and maintained in many developing countries, site surveys may generally be required. The information and data collected should be as objective as possible but we may need to rely on subjective responses. *Additional Note*: Along with addressing questions regarding knowledge and attitudes on the 3Rs and resource efficiency, the social survey used to measure public awareness could also include questions on individual practices on the types of actions included in the above indicators, though this should not substitute for the above quantitative indicators; rather, it is an opportunity for cross-checking the relevance and accuracy of collected data.

Table 2. Methods of measurement
(Source: authors)

05 Caveats for measurement

A social survey provides a straightforward, clear way of measuring levels of public awareness; however, responses can be **sensitive to the way questions are framed (worded). Questions should thus be posed in a neutral and non-leading manner.**

One of the goals of conducting public surveys is to enable chronological comparisons; we usually hope to see how a certain situation (i.e., in the context of this factsheet, the level of public awareness) progresses over time with application of certain appropriate public awareness raising initiatives, based on the establishment of an initial baseline and comparison against that baseline in subsequent surveys. However, use of the same individuals over time is often difficult as people can move into and out of a given survey area. Thus, it is important to be clear on what is being measured and how comparisons are made. A change in awareness in individuals may be measured over short-term periods in relation to specific interventions or awareness raising events, while over longer-term periods it is more feasible to measure the aggregate level of public awareness and also the extent of standard deviation in individual awareness levels.

It also needs to be understood that if a social survey is used, it is possible to ask direct questions about practices, but this can lead to exaggerated responses and only receiving answers that represent the ideal, i.e., what you want to hear. Thus, clear use of figures as mentioned above is more trustworthy than open-ended questions.

If a social survey and household performance (i.e., public action) indicators are used in conjunction, it is possible to 1) demonstrate performance, 2) identify gaps in achievement against pre-determined goals, and 3) identify appropriate interventions for addressing these gaps (at least to a relatively