

Public participation in solid waste management during mega festivals: A pilot study

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Abstract- Large festivals with over 50,000 participants have become a customary but hardly investigated practice in many countries across the world. Festivals management is increasingly being complicated because of their negative consequences such as solid waste accumulation and the destruction to the hosting city attractions. Recycling is an important process to reduce the negative consequences of the waste which public plays an extremely important role regarding its success. Therefore, this study is dedicated to explore campers' environmental awareness and willingness to participate in the solid waste source separation during mega festivals in Kerbala city, Iraq. The outcome of a structured questionnaire survey completed by 20 campers' managers during one mega festival showed low environmental awareness among the participants. On the other hand, the majority of the campers were willing to separate their wastes during mega festivals. These results can be invested in establishing a base for implementing a recycling scheme during such festivals.

Keywords: *Environmental awareness; Solid waste management; Waste recycling and recycling intention.*

I. INTRODUCTION

Travel and tourism is an important industry that can sustain high level of employment and income in many countries across the world. El Hanandeh, 2013 [1] stated that this industry represents 8% of the world's total job and 9% of the world's gross domestic product. On the other hand, it is one of the mean sources of negative effects on the environment and human health [2]. Religious tourism is one form of travel and tourism industry where individuals travel to take part in particular festivals that is significance in their faith. The World Religious Tourism Association [3] stated that about 300 million people joins religious festivals in many countries around the world.

Every year, several religious festivals attended by millions of tourists take place in the city of Kerbala, Iraq [4]. The visitors' inflow raises the city population, which substantially increases the amount of the solid waste generated and negatively influences the solid waste management system. Kerbala city currently uses a primitive management system that causes major impacts on the surrounding environment and human safety. In addition, the growing costs of waste

collection, treatment and disposal have escalated the problems of managing festivals wastes [5].

With the growing concerns on climate change and resource depletion, promotion of resource saving through 3R (reduction, reuse and recycling) has become critical. Solid waste recycling is a useful benefit measure that can reduce the total quantity of disposed wastes and greenhouse gases emissions where the public plays a vibrant part about its success [6]. However, low public participation is a problem facing the success of the waste management systems mainly in developing countries such as Iraq [7]. About 60-80% of the European countries solid waste are recycled while only small percentages of waste are treated likewise in developing countries. Consequently, significant amounts of waste are disposed of in the landfills without recovery [8].

Appropriate infrastructures are essential for the success of the waste management system. However, the preferences and the knowledge of the system users greatly influence the success of the management system. For these reasons, conducting a comprehensive study to explore the variables that affects the waste management implementation such as public preference, involvement willingness and awareness is crucial. Many studies have considered these variables in the literature [9]. However, only a dearth of researches have considered such variables during mega festivals [10]. To achieve a solid and functional management plan during mega festivals, it is essential to investigate and analyze the variables that significantly affects public participation in the recycling scheme.

With the intention of developing the simple waste management system currently applied in Kerbala, it is vital to study public preference and willingness to practice solid waste source separation during festivals. Thus, the current research has been devoted to understand public reaction towards implementation of a recycling program during mega festivals. To achieve this aim, Ashura, a multi-million festival occurs in Kerbala attracting up to 5 million participants, has been selected as a study festival.

II. METHODS

A. Study festival

Kerbala city which is located in the middle of Iraq (Fig. 1) (62 mile southwest of the Iraqi capital, Baghdad) and covering an area of 1939 square miles, is populated by 1,003,516 residents [11]. It is considered an important tourism center in the country as it holds a number of religious festivals every year. Millions of visitors are increasingly participating in these festivals [4].

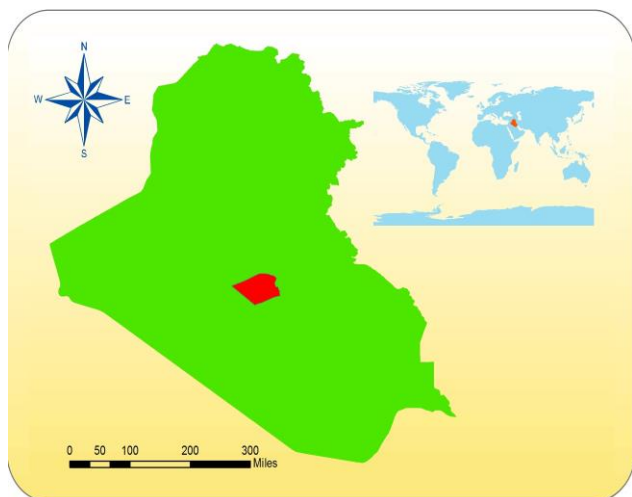


Figure 1. Kerbala city geographical location

One of the religious festivals in the city is Ashura. This festival is attracting approximately 5 million visitors and lasting up to 10 days [12]. According to the interview with the holy shrine authorities, there are around 600-service camp distributed across the city center providing free meals and drinks for all visitors. In 2015 festival, about 12,800 tonne of municipal solid waste were generated owing to the large number of visitors and the availability of free meals and drinks. Waste management authorities usually collect these wastes and transfer it directly to the landfill without treatment, which is negatively affects the surrounding environment and human health

B. Research instrument

In order to collect data regarding the campers' attitude towards the application of source separation and recycling program during this festival, a structured survey questionnaire was developed. It was designed in three different parts according the required data. The first part of the questionnaire was aimed at gathering information about the campers' demographics such as education level and age. The second part contains questions on the campers' knowledge about waste management subjects such as recycling and source separation. While, part three gathers information about the actions that encourages the campers and the visitors to practice solid waste source separation during this festival.

C. Field data collection

Through face-to-face interview surveying method, the study randomly selected 20 camp managers from the city center of Kerbala (old city) to collect the required data. The face-to-face interview surveying method was adopted due to its high response rate [8]. Groups of interviewers carried out the survey during three days while the festival ongoing. All of the interviewers were trained about survey ethics, asking questions and recording responses. The interviewees took about 20 minutes to respond to all question asked by the interviewers. All the participants provide their consent.

D. Analysis

Descriptive analysis was performed using SPSS software version 23. Multiple-choice questions were analyzed and displayed in the form of a percentage from the total participant. Open-ended questions were categorized into several pre-coded groups and presented graphical form.

III. RESULT AND DISCUSSION

Campers' demographics including age, gender, and level of education are presented in table 1. All of the camps' managers were male. The majority of the campers (45%) have completed primary school and 85% of the respondents were older than 36 years.

A. Participants knowledge

To plan an efficient solid waste management system, it is vital to explore and understand the background knowledge that the system users have as they dramatically affects the success potential of such system [8]. Therefore, several questions were designed to test the knowledge that the participants have about waste management subjects such as environmental pollution, solid waste pollution and solid waste management. The outcome shows that the level of knowledge about waste management subjects were low across all participants. About 5% of the participants have good knowledge level about environmental pollution. Similarly, participants level of knowledge about subjects including waste pollution, reduction, recycling and composting were very low (10%, 5%, 5% and 5% respectively) (Fig. 2).

TABLE I. CAMPERS PROFILE

Groups		Number	Percent	Total
Education	Higher education	6	30.0 %	20 (100%)
	Secondary education	5	25.0 %	
	Primary education	9	45.0 %	
Gender	Male	20	100 %	20 (100%)
	Female	0	0.0 %	
Age Group	18-25	0	0.0 %	20 (100%)
	26-35	3	15.0 %	
	36-45	9	45.0 %	
	>45	8	40.0 %	

According to Vidaarachchi et al. [13], level of knowledge about solid waste management subjects dramatically affects the public participation in such plans, as it is enhancing their

responsibility towards the environment. The current study showed that the campers in the city of Kerbala have poor knowledge about waste management subjects therefore it is very important to start educational campaigns to raise their awareness.

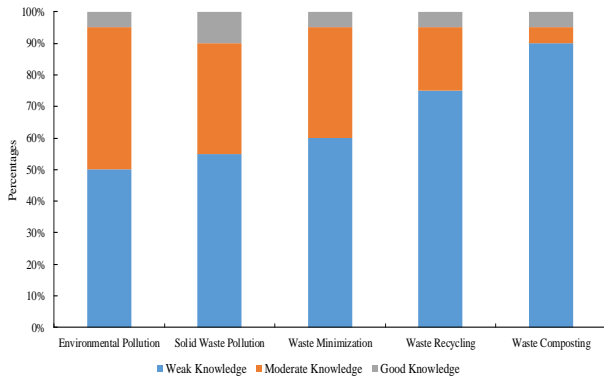


Figure 2. Participants knowledge level

B. Solid waste sorting willingness

Some of the questions were aimed at establishing a base regarding the willingness of the Campers to practice waste source separation during mega events as they play an important role in the prosperity of recycling program. All participants were asked about their intention to practice municipal solid waste source separation. About 60% of the respondents were willing to practice solid waste recycling during these events for several reasons such as the want to help enhancing waste management service (83.3%), improving the city economic (41.6%), the believe it is their responsibility (66.6%) and for other reasons (41.6%) (Fig.3A).

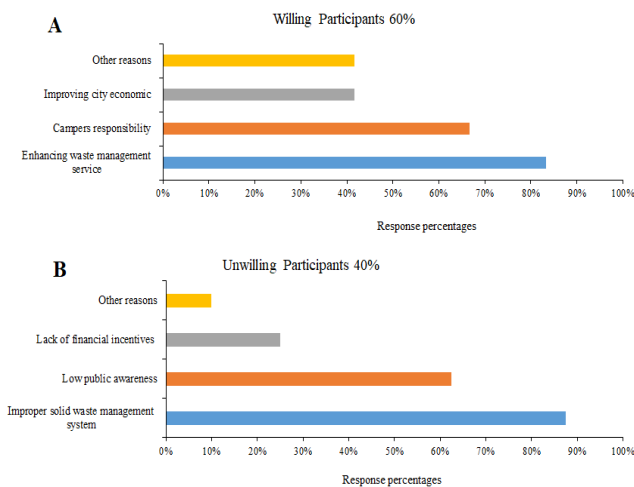


Figure 3. Categorised response to the question “Are you willing to sort the waste during mega Festivals and why?”

Keramitsoglou and Tsagarakis [7] stated that waste recycling program success depends on the availability of recycling opportunities to the public. Around 40% of the campers were unwilling to practice solid waste source separation for several

reasons including the absence of proper solid waste management system (87.5%), the lack of awareness among the public (62.5%) and the lack of financial incentives (penalties and rewards) (25%) (Fig.3B). Therefore, implementing a recycling program during mega festivals might be successful since 60% of the campers intended to participate in a future recycling scheme.

C. Public encouragement to practice waste sorting

With the aim of increasing the efficiency of solid waste recycling scheme through mega festivals, it is essential to enhance the cooperation between the public (Campers) and the collection authority (Kerbala municipality). Ascertaining the public preference for practicing solid waste source separation is vital. Therefore, questions were designed to obtain the actions that might encourage the campers to sort solid waste while the festival is ongoing. The participants were asked to select one preferred option that encourage them to sort their waste from four options. Around 55% of the participants chooses the provision of recycling bins to start solid waste separation. Other 25% of the respondents selected the low enforcements option to increase the public participation in the recycling. While, minority of the campers selected financial incentives and staff training options (15% and 5% respectively) (Fig.4). In addition, the respondents were asked to suggest some measures that can enhance the visitors’ role in waste recycling. The majority of the respondents suggest that providing public waste bins in the major roads of the city center and increased publicity and awareness (75% and 70% respectively) might influence the visitors’ motivation to take part in a future recycling plan. The imposition of fines has been proposed by 40% of the campers to increase visitors’ participation in the separation of waste (Fig.5).

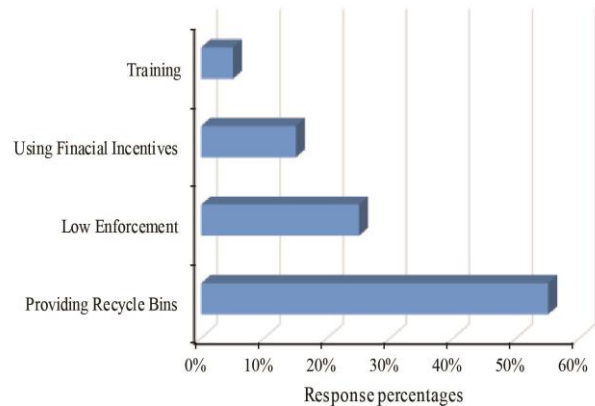


Figure 4. Responses to the question “Which of the following options encourages you to sort the waste?”

IV. LIMITATIONS

This study is limited to the use of expressed recycling intention as the city waste management system lacks the use of recycling schemes and facilities. Therefore, practical recycling behavior should be considered by further researches.

V. CONCLUSION

The result of the study showed, although, a large percent of the camps managers have low knowledge and awareness about solid waste management subjects, a significant number of the campers were willing to sort their waste during mega festivals. Some of the reasons that minimizes public willing to participate in a separation plan can be attributed the absence of a proper recycling scheme and facilities and the low public awareness about solid waste management issues. A starting point to tackle this issue is by implementing a recycling program and increase the publicity and awareness.

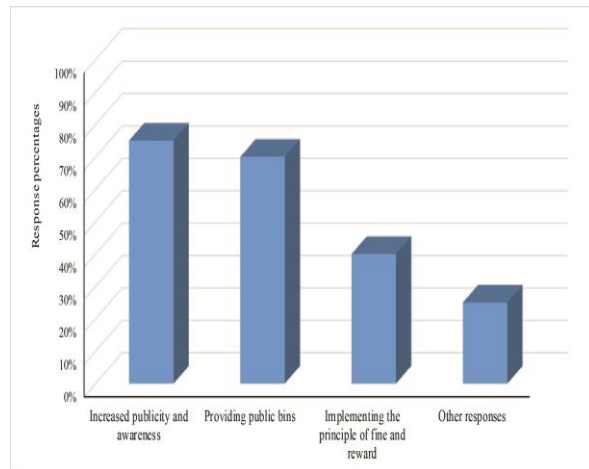


Figure 5. Categories responses to the question "Please suggest actions that encourages Kerbala visitors to recycle their wastes."

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