WATER POLLUTION: COMPLIANCE ON GREASE TRAP USAGE AMONG FOOD PREMISES IN MALAYSIA

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Abstract
The study aims to explore motivation and barriers among restauranteurs to comply with new regulations to install a grease trap in their food premises in Malaysia. This study used an exploratory qualitative design. The 38 participants of the interviews survey were food premise's owner that had attended a discussion about grease trap usage on 28 September 2020 conducted by the Local Council of Baling. Verbatim transcripts were analyzed using thematic analysis based on Braun and Clark's six steps method. The results show awareness, benefits to individuals and society, and social influence as motivation factors. Meanwhile, technical factors, knowledge, financial, inconvenience, and enforcement emerged as barriers.

Introduction
Water protection is an essential element of environmental issues. Clean water and sanitation are highlighted as one of the Sustainable Development Goals of the United Nations. Availability and accessibility to clean water have to do with human civilization and human rights [1]. A relevant part of the world population still lacks access to clean water and sanitation in 2020 [2], while millions of people have lost their lives to water-borne related diseases such as diarrhea, cholera, dysentery, typhoid, and polio [3]. In Malaysia, the river is the primary source of water supply which contributes to 90% of the water supply [4]. Malaysia must face unprecedented challenges in the field. 53% of the rivers in Malaysia are polluted, and the trend is deteriorating [5].

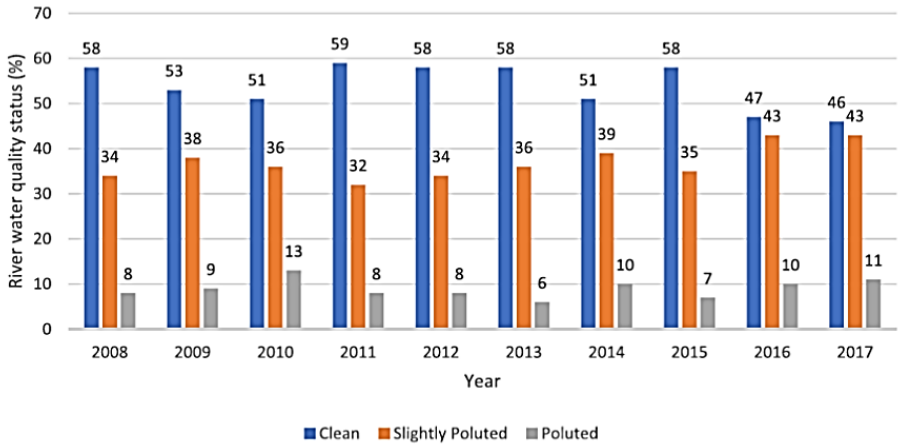

Figure 1: River water quality in Malaysia between 2008 and 2017 [5]

According to a report conducted by the Department of Environment (DoE) under the Pollution Prevention and River Water Quality Improvement Program for the Eighth Malaysia Plan and the Ninth Malaysia Plan, it was found that food premises as one of the main contributors to river pollution [6]. As a result, proper grease management has become a significant waste management issue [7], and illegal disposal and improper management of fats, oils, and grease

(FOG) discharge remain the primary source of river pollution cases in Malaysia [8]. Pollution occurs due to the discharge of wastewater with fat, oil, and grease content from the sink of food premises into the drainage system without any separation process [9]. For instance, used cooking oil from food premise sinks flowing into wastewater systems will cause problems to wastewater treatment plants or be integrated into the food chain through animal nutrition, thus becoming a potential cause of health problems to humans [10].

There are several approaches to environmental protection. Cleaner production [11] solutions aim to avoid water pollution, or the concept of circular economy [12] helps to reduce the amount of waste landfilled. We can acknowledge the benefits and long-term impacts of deeply agree that investments in these technologies, but it should be noted that the required efforts may be at limited availability. The investment needs may exceed the opportunities, or the lack of state aid also hinders the implementation of cleaner technology. In such cases, the less effective solution of the end-of-pipe protection is particularly appreciated. In a local society or a country where clean water gives the bottleneck of the urban system and well-being, filters can provide a leap forward before changing the technology.

Moreover, the results achieved may encourage further progress. The paper focuses on one device applicable in the study area. A grease trap (see Figure 2) is a device that serves to separate food waste, fat, oil, and grease from wastewater before the water is discharged to a sewer system or septic tank.

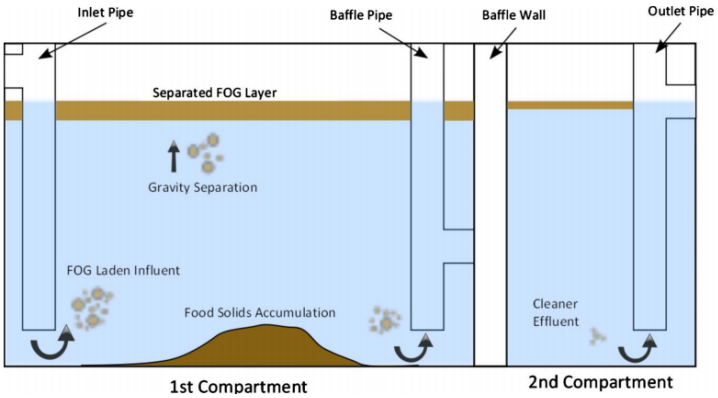

Figure 2. Cross-section of typical grease interceptor [13]

The installation of grease traps is one of the practical methods in dealing with the problem of pollution to the irrigation system [9]**.** Thus, the Guidelines for Grease Trap on food premises in local authority areas was prepared by the Local Government Department, Ministry of Housing and Local Government in 2005 and made it mandatory to use food waste and oil filters in food premises nationwide, it has become a part of the condition for the issuance and renewal of business licenses in local authorities [6].

Experimental

This paper explores the motivations and barriers faced by restauranteurs to install a grease trap in their food premises by asking them two specific key questions what motivates them to install a grease trap and the barriers to installing a grease trap. A total of 38 persons were purposively chosen for an interview. Participants were among those 61food premises that obtained grades B and C during the food premises grading assessment in 2019 due to not installing grease traps. Inclusion criteria for participation in the interview, participants, had attended a talk about grease trap conducted by the Local Council of Baling on 28 September 2020. Fieldwork observation, face to face and telephone interview was used as an instrument for data collection. Data from

the interview were transcribed word by word. The participant's statement was openly coded through a thematic six-step analysis method [14].

Results and discussion

47.4% of the participants have installed a grease trap (marked as installers), while 52.6% still do not use one (marked as non-installers). Installers were asked further on what motivates them to install grease traps, and non-installers were asked about the hindrances they encountered while installing grease traps.

Main themes	Sub-themes	Number of responses	Percentage (%)
Awareness	Environmental cleanliness Prevent drain from clogging Awareness to keep the environment clean	12	50
The benefit to individual and society	Less complaint from society Easier to clean and manage	8	33.3
Social influence	Government Society	4	16.7

Table 1 Main themes and sub-themes for motivation among restauranteurs to install a grease trap in their food premises

Table 1 shows the thematic analysis revealed three main themes for motivation to install grease trap which composed of (i) Awareness: environmental cleanliness, prevent the drain from clogging and awareness to keep the environment clean; (ii) Benefit to individual and society; fewer complaints from society and easier to clean and manage; and (iii) Social influence: government and society. Based on the main themes count, awareness most frequently cited by participant (cited 12 times), followed by second reason labeled as a benefit to individual and society (cited 8 times), and third motivation is driven by social influence (cited 4 times).

Examples of the typical responses about motivation are as follows:

"To ensure oil, food waste not entering drain, I see others stall installed it as well so I installed also, I just want to ensure drain behind my stall not clogging due to oil and food waste."

"To keep the drain clean from oils and food waste and prevent clogging."

"If I do not install a grease trap, I had to clean drain every night and if I am not clean it will smell bad, and nearby stalls and people will complain as well."

"I received a complaint before from public due to bad smell from my stall drain so I decide to install grease trap to avoid that from happen again."

"Because it is promoted by the local council to install grease trap and many other stalls already install it."

Non-installers were asked what obstacles they encountered to install grease traps. The thematic analysis revealed five main themes, namely: (i) Technical: small space, type of building and use of the different type of filters, (ii) Knowledge: lack of knowledge and information, (iii) Financial: expensive cost of installation and business slow during MCO/pandemic, (iv) Inconvenience: challenging to clean and manage and (v) Enforcement: lack of enforcement.

Main themes	Sub-themes	Number of responses	Percentage (%)
Technical	Small space Type of building Used different types of filters	7	30.4
Knowledge	Lack of knowledge and information	6	26.1
Financial	Expensive cost of installation Business slow during MCO/pandemic	4	17.4
Inconvenience	Difficult to clean and manage	4	17.4
Enforcement	Lack of enforcement	2	8.7

Table 2. Main themes and sub-themes for barriers to install grease traps among restauranteurs

The technical factor is the most common response given by non-installers (cited 7 times), which participant indicates that under their stall sink too small to fit in the grease trap, open space type of restaurant, and some of them used different types of food filters. The second typical response is a lack of knowledge and information regarding grease traps and how to install them. The third typical response is both financial and inconvenience. A small number of responses (cited 2 times) reported that they had not installed grease traps because of lack of enforcement, due to the local council made it mandatory to install a grease trap to apply for a business license for food premises. Examples of typical responses related to barriers encountered to install grease trap:

"My sink located at open space, I used to place grease trap before here but it is stolen since then I afraid to install it again."
"Space under my sink cannot fit the grease trap."
"In case I install it, it still no use because I did not know how to use it"
"I did not know which supplier I should contact to install grease trap, it would be easier if I knew who to contact to install it."
"This restaurant has been opened for 40 years already, since my grandfather generation and I am the third generation, we did not install grease trap and no problem so far."
"It cost me RM 800 includes the cost of the installation which is a lot for me since I could not open my business as usual due to MCO."
"My food business was badly affected by Covid, we could not manage to get revenue like we used to get before MCO."
"I opened a bakery stall, if I install grease trap flours will be accumulated and clumped together which make it difficult to clean later, so it easier for me not to install."
"I did not use much oil in this restaurant, we used to cook at home and bring food here to sell, we just used a simpler type of food filter on the sink."

Conclusion

The results suggest that installers are willing to install grease traps even though installation costs are quite expensive due to their awareness of environmental protection. On the other hand, the approach of non-installers will provide important insight for local authorities to take into consideration in order to improve participation among food premise owners in the future. It is expected that understanding people's motivation and obstacles will help overcome the waste management problems in Malaysia, and local authorities could provide an affordable solution and technical support to local restaurant owners as the first step towards sustainability.

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