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Mask and ATK Wastes Management in Urban Community By People Participatory Process under COVID-19 Pandemic Crisis of Bangkok, Thailand

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Abstract

Under the situation of Coronavirus 2019 (COVID-19) pandemic for the past 2 years, people had used the facial masks (masks) for protection of COVID 19 and antigen test kit (ATK) waste and left its mixing with the general wastes without segregation at source. Rationally, It should conduct the study on such masks waste collection management as qualitative research, of which the objectives were 1) to develop the collection system of the used masks and ATK in the community by people participatory process, 2) to raise awareness for the importance of the hygienic collection of the used masks and ATK management and get familiarize with participatory process, 3) to survey the management of used masks and ATK management at the communities, construction worker camp sites, and industrial dormitories in Bangkok Metropolitan Administration (BMA) area. The study area covered 11 communities in Dusit District (Inner Bangkok), 5 construction worker camp sites in Laksi District, and 5 industrial plants in Bangkhen District. The study of 11 communities resulted that the used masks and ATK waste were averagely collected as for 19.25 kg/week or 2.75 kg/day with the trend of weekly increasing. The appropriate model for the communities on used masks and ATK management was the means of participation process. People participatory process was performed through the community leaders and committee for the provision of collection containers, location and number of containers, appointing date/time and frequency. The effective mean of participation process was not only public relation together with requesting for people participation but also monitoring the hygienic segregation and collection of the used masks and ATK wastes. The appropriate model for the construction worker camp sites was creating awareness for an importance on hygienic segregation and collection of the used masks and ATK wastes together with issuing the regulations for safe living in the camp for such hygienic segregation and collection of wastes. The communication to the workers should use simple and understandable language for hygienic mitigation measures. The appropriate model for industrial dormitories was creating the awareness on an importance of the hygienic collection management of the used masks and ATK wastes. The strong protection measures were issuing the regulation with strict enforcement on segregation and collection management of the used masks and ATK wastes under the intensive monitoring by the workers' chief. The hygienic equipment and accessories had to be provided adequately for both number and locations of wastes drop-off point. Communication to the Thai and foreign workers by simple and understandable language.

Keywords : People Participatory; Used Mask; COVID 19 Pandemic

Introduction

The situation of pandemic of Coronavirus disease or COVID-19 has generated the management problem of used masks mixed with general wastes left by household. That has caused increasing the health risk on COVID-19. Pollution Control Department, Thailand, has forecasted that if using the mask as 1 piece/person/day, the used masks would be 1,800 million pieces/month. The used masks might have been contaminated with COVID-19 virus caused by secretions such as saliva, mucous, phlegm, etc. Such used masks were considered as infectious wastes which enable spreading of the diseases like COVID-19. Thus, it required the hygienic collection management of the used masks. One of the efficacious means of the used masks collection was the people participatory process. For the fiscal budget 2019, Bangkok Metropolitan Administration generated infectious wastes of 42.53 ton/day collected from 3,378 public health service stations by Krungthep Thanakom Co., Ltd, and disposed at the infectious wastes incinerator plants at On Nuch and Nong Khaem. (Figure 1) [1]. Regarding the fiscal year 2020 under the normal condition prior the pandemic of COVID-19, the infectious wastes generated in Bangkok Metropolitan area was averagely 43.94 ton/day which was not different compared to the generation rate in the past year. During the pandemic period of COVID-19 particularly at the heavy pandemic during January-June 2021, the infectious wastes had increased as high as 74.07 ton/day, which was generated from the medical treatment and diagnosis units in the hospitals, disease surveillance and laboratory analysis of severe viral including the temporary health care stations and the quarantine stations [2, 3]. In addition, the generation rate of infectious wastes as COVID-19 of the medical treatment of COVID-19 in hospitals was averagely 7.5 kg/capita/day. Whereas, the quarantine area, the generation rate of infectious wastes as COVID-19 was averagely 1.32 kg/capita/day [4].

a) Courtyard for Infectious Wastes Containers at On Nuch Solid Wastes Disposal Center

b) Infectious Wastes Vertical Rotary Kiln at On Nuch Solid Wastes Disposal Center

c) Infectious Wastes Rotary Kiln at Nong Khaem Solid Wastes Disposal Center

Figure 1 Infectious Wastes Incinerator of Bangkok Metropolitan Administration (BMA)

Regarding the good practice on infectious wastes management under the situation of COVID-19 Pandemic, the recommendations of the United Nations Environment Program (UNEP) are to categorize the hierarchy of wastes basing on the concept of 3 R (reduce, reuse, recycle) together with the holistically integrated management by the responsible agency. It is necessary for the government to establish the emergency plan under the criteria and conditions of each local organization as well as management strategy, of which the government and local authority organizations have to play an important role for such situation [5-7]. The infectious wastes contaminated with COVID-19 virus were generated from the health service rooms, laboratories, and any things related with COVID-19 patients including wastes from cleaning in the health stations and centers. Such infectious wastes have to be collected in the separated bags and disposed of according to the existing law [8]. Management of infectious wastes as COVID-19 in various countries was variety. Wuhan county, Republic of China where the COVID-19 firstly occurred, the infectious wastes as COVID-19 generated in the heavy period of pandemic was almost 247 ton/day, which was almost 6 times of the amount of infectious wastes generated under the normal condition. Wuhan County had hired 4 additional companies for medical waste disposal and constructed the emergency treatment stations as well as mobile incinerators for burning the high increasing amount of PPE wastes such as masks, gloves, and single use of protection equipment [9]. At Japan, management of infectious wastes as COVID-19 generated from hospitals had employed incineration, autoclave followed by destruction; dry disinfection and destruction; and disposal by specific sanitary landfill. Regarding the management of COVID-19 wastes generated from household, it would be mixed with other flammable wastes and burnt by incineration [10]. At South Korea, the used masks and PPE had to be brought out of the places for hygienic disposal on the same day that wastes generated [11]. For Thailand, the infectious wastes as COVID-19 generated during the pandemic of COVID-19 was over the disposal capacity of incinerator, which could be indicated by the complaint news on red bag of infectious wastes leaving in the community as well as the problem of solid wastes collection on time of the local administration organization. Basing on such problems, all agencies had collaborated to find the solution for COVID-19 waste problems by issuing the announcement on bringing infectious wastes to be the fuel for incinerator of some industries in order to burn wastes as for temporary management. BMA has hired Krungtep Thanakom Co., Ltd. for disposal of infectious wastes generated in Bangkok area with the capacity of 70 ton/day and forecasted to increase the disposal capacity of 79.99 ton/day in August 2021, that would have residual infectious wastes of 9.99 ton/day [1]. BMA had provided specific containers (red color) for collection of used masks distributing in the public area. The problem was that the used masks was still left mixing with general wastes. This was due to no segregation of the used masks and general wastes of household. [12, 13]. Thus, it is the rational to conduct this research, of which the objectives were 1) to develop the collection system of the used masks and ATK in communities by people participatory process 2) to raise awareness of people on the importance of hygienic collection of the used masks and ATK management and get familiarize with participation process, and 3) to survey the management of used masks and ATK at the construction worker camp sites and industrial dormitories in Bangkok Metropolitan Administration area.

Study Area

The study area consisted of 11 communities in Dusit District (Inner Bangkok Metropolitan area) comprising of 2,496 households and population of 6,614 peoples; 5 construction worker camp sites in Laksi District located in the north of Bangkok Metropolitan comprising of 1,136 workers; and 5 industries in Bangken District located in the north of Bangkok Metropolitan comprising of 691 workers (Figure 2).

Material and Method

1) Studying the guideline of mask and ATK wastes collection of the study area as mentioned above.

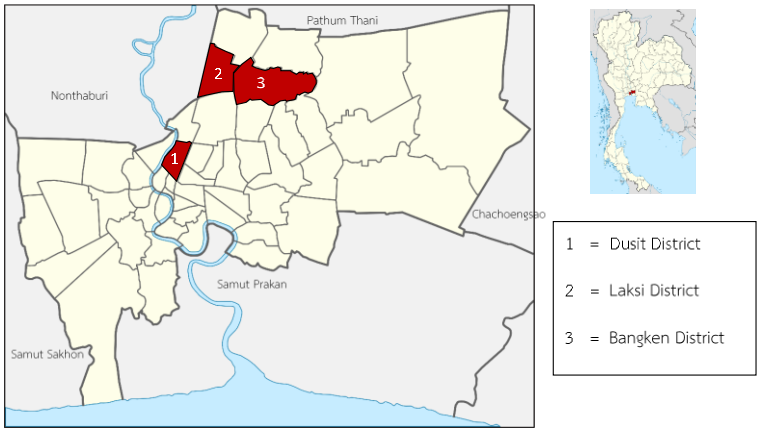


Figure 2 Study Area in Bangkok Metropolitan Administration

2) Investigating the appropriate mask and ATK wastes collection of the mentioned study areas by the participation process.

- For community study, focus group discussion with community leaders or representatives, BMA staffs and researchers had been performed in order to scrutinize the mean for the highest decision of people for such waste collection. In addition, the survey of the used masks and ATK waste had been undertaken for 4 weeks parallel with public participation on correct segregation and littering of used mask and ATK, collection of them and follow up on the waste separation of the target communities.

- Construction worker camp sites and industrial dormitories study. Similarly to the community study, the study had been performed by workers participatory process so as to consider the practical segregate and leave the used masks and ATK wastes. The problems and solutions of such practical collection also were investigated in order to assemble for the appropriate collection management guideline of the used mask and ATK waste for the construction worker camp sites and industrial dormitories.

3) Summarizing the guidelines of the used masks and ATK wastes collection from the studies of communities and construction worker camp sites / industrial dormitories.

4) Developing the appropriate model for the used masks and ATK wastes by following steps;

- presenting the summarized guidelines to the stakeholder including community representatives, managers of construction worker camp sites, managers of industries, officers of Dusit District, Officers of BMA, Experts as the adviser of the Research Project in order to get the comments of all stakeholders;

- compiling all relevant comments to summarize the mutual practical guideline for the appropriate model waste management of the used masks and ATK wastes.

Results and Discussion

1. Community participation on used mask and ATK waste collection model

Participation of people on the collection of the used mask and ATK waste was firstly started with the meeting with 11 community leaders, staffs of District Officers who are responsible for collection and transportation, staffs of BMA who are responsible for policy and action plan. The content of meeting proposed to the participants was rationale and importance of the management of the used masks and ATK wastes collection, awareness of the dangerous of non-hygienic/no segregation of such wastes, guideline for community on hygienic separation and collection of such wastes. The significant content was finding out the appropriate model and agreement such as number of participatory households; collection containers including number, location, appointment time and frequency of collection, output of collection; and community representative. Summary and recommendation are as follows.

1) Convincing all household in each participatory community to participate group meeting and activities for such wastes collection. In the meantime, raising awareness of people by presenting the important content of the used mask and ATK waste management on the public relation board sized 120x50 cm. installed for each participatory community.

2) Providing the collection containers and red plastic bags. The community leaders/ representatives provided the red handy bags sized 8x16 inch for each household to segregate and collect the used masks/ATK wastes and left at the red containers provided along 4 weeks survey.

3) The District Officer provided the red containers sized 80 liters placing at the suitable locations suggested by the participatory communities. Total of 24 red containers were provided together with the announcement to the people for drop-off points as shown in Figure 3.

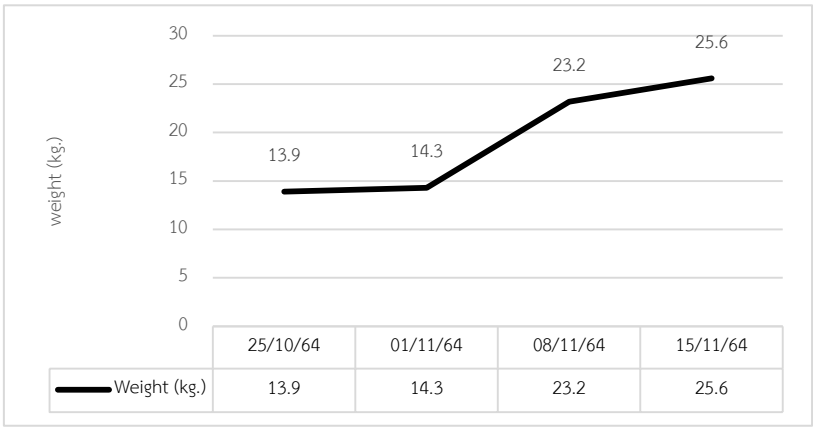
4) Set Out time for collection of such waste by BMA District Office. Result from consulting/survey the leader opinion, the collecting time was Sunday starting at 08.30 since the public announcement would be easier.

5) Frequency of collection was once a week on the designated day as the number of waste collection containers, placing points, and volume of wastes had capacity for once-a-week collection.

Figure 3 Collection Containers Placing at Various Points

Regarding the study results, it revealed that communities had participated for not only recommendations such as provision of red bags for the used masks and ATK wastes collection from household, public relation board, but also drop-off points for collection containers, frequency of wastes collection, etc. In addition, the memorandum of agreement had been made to assign the community representatives for public communication on segregation and collection of the used masks and ATK wastes by red bags and red containers, respectively at the collection points together with the weight measurement. It was found that the used masks and ATK wastes had been increased weekly, representing the people had strong participation on this segregation and collection activities. The used masks and ATK wastes were averagely 19.25 kg/week or 2.75 kg./day (Figure 4). It is estimated that collection of the used mask less than 1 piece/person-day, basing on the assumption that the used masks was partially left and mixed with general wastes, and some peoples used cloth masks being reused after washing. Accordingly, public relation had to be intensively undertaken for leaving and collection the used masks/ATK wastes as hygienically designated, which could be effectively performed through the community leaders. Besides, it was found that there was other general wastes mixed in the red containers provided only for the used masks and ATK wastes at the large communities with crowded transportation. Such mistakes of wastes leaving and collection was due to lack of awareness for segregation, non-suitable drop-off points of red containers as well as inadequate public relation.

Base on the study results, the appropriate model for the used masks and ATK wastes collection in the communities on the basis of the people participatory process should have 5 levels of participation approach including informing, consulting, involving, collaborating and empowering [14] through the community leader and committee. The information providing to the study community people consisted of segregation/collection at home with the red bags, leave to the red containers at the drop-off points, appointing time and frequency



*One piece of mask weights is about 2.8 – 3.0 grams

Figure 4 Used Masks/ATK Wastes Collected during October-November 2021

for collecting by the District Officer together with the informative announcement on the public relation board, as well as monitoring the performance of such hygienic waste collection. The community leaders and committee resided in the area who are very close to and have high capability to communicate with the community members. In accordance with the research results, any communities leaded by the strong leaders/committee who were very intensive on public relation and monitoring the segregation/leaving and collection directed to the hygienically method as designated, the used masks and ATK wastes collection was accordingly successful. In addition, the District Officer have to effectively pay attention to collect such wastes at the appointed time and frequency as well as cleaning the red container with disinfectant solution presenting in front of people for acceptance and participation of people (Figure 5)

2. Construction worker camp site participation on used masks and ATK wastes collection model

The used masks and ATK wastes collection were not hygienically as expected. Mostly, the specific wastes containers (red color) provided for the used masks and ATK wastes) at the drop-off points (Figure 6) , but there was an error on mixing with general wastes at drop-off point prior further collection by the District Officer. In addition, no coordination between the construction worker camp site and the district officer, it causing no waste separation. Most workers at the construction camps are willing to participate for segregation of the used masks and ATK wastes and further disposal by the District Office. However, some construction camps were worried about service fee for collection and disposal in the future, particularly if use the service of private company for collection and disposal because of the problems learnt from the past period of COVID-19.

Consequently, the appropriate model for waste collection of the used masks and ATK wastes for the construction worker camp site was awareness raising and knowledge management on the importance of hygienic collection of such wastes. The workers would very well participate on this model application as used to experiencing the past pandemic problem of COVID -19 as well as the strict regulation for segregation/leaving and collection of such wastes. In addition, the manager of construction camp site had to intensively monitor the model application by the workers and further hygienic segregation and collection to disposal by the District Officer. Therefore, the significant guideline is to firstly issue strong and strict regulation for the construction worker camp site and the use the understandable language for communication to the workers especially the foreign workers in order to make an apparent perception and action.

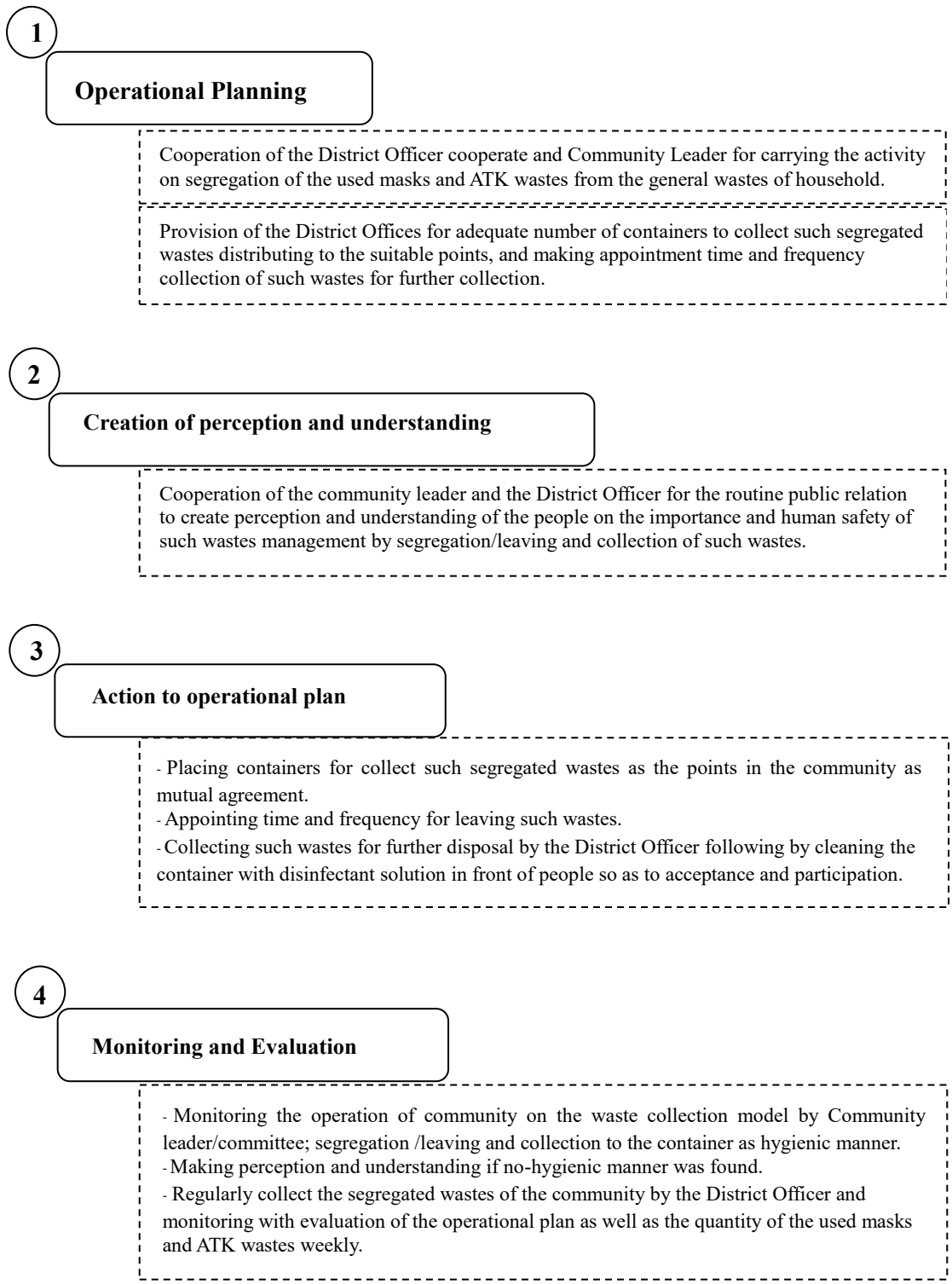


Figure 5 Operational of Used Masks and ATK Wastes Collection in the Community by Participatory Process

Figure 6 Used Masks and ATK Wastes Litters at Worker Camp Sites

3. Industrial dormitories participation on the used masks and ATK wastes collection model

Waste collection of the used masks and ATK wastes among the industries were different. The large industry had segregation/collection and disposal system in the correct process (Figure 7). Some small industries consisting of less than 50 workers did not have such wastes segregation. The problem found for the small industries consisting of foreign workers.

Figure 7 Used Masks and ATK Wastes Litters at Industrial Dormitories

Accordingly, the appropriate model for collection of the used masks and ATK wastes for the industrial dormitories was awareness raising and knowledge on the importance of hygienic collection of such wastes together with suggestion and collection of such wastes to the workers due to the close living causing risk to diseases by COVID-19, particularly the industrial dormitories. Mostly, industry would pay more important to the production process area. Additionally, the industrial owners/ managers have to issue the strict regulation for living in the dormitory and housing area for segregation/leaving and collection under the close monitoring of the worker head as well as facilitating the adequate number of containers with apparent location. Public relation and communication to the workers with understandable language particularly to the foreign workers to encourage cooperation.

By the reason of characteristic of similar construction worker camp sites and industrial dormitories, the collection management of such wastes are as follows (Figure 8)

Analysis of the Research Result

Base on the survey, the success factors for segregation of the used masks and ATK wastes were awareness raising and knowledge management to the people. Such success factors are in conformance with the study of Lubna Salsabila et al [15]; but in different viewpoint as the existing payment for solid wastes collection and disposal fee had already made, thus it was not necessary to participate in any solid wastes activities. In other viewpoints, if people have understood the correlation of their behaviour and environmental deterioration, they will have higher trend of participation. It has to realize that not only to dispose the unwanted materials but to value the resources and conserve it as stated by O'Connell, Elizabeth J. [16]. Particularly the study of success factors by Mejjad, N. indicated that the change of behaviour on segregation, disposal as well as installation of facilities for effective and practicable solid wastes disposal management in the city [17] together with the involvement of private sector that would enable higher effective management of solid wastes disposal. [18].

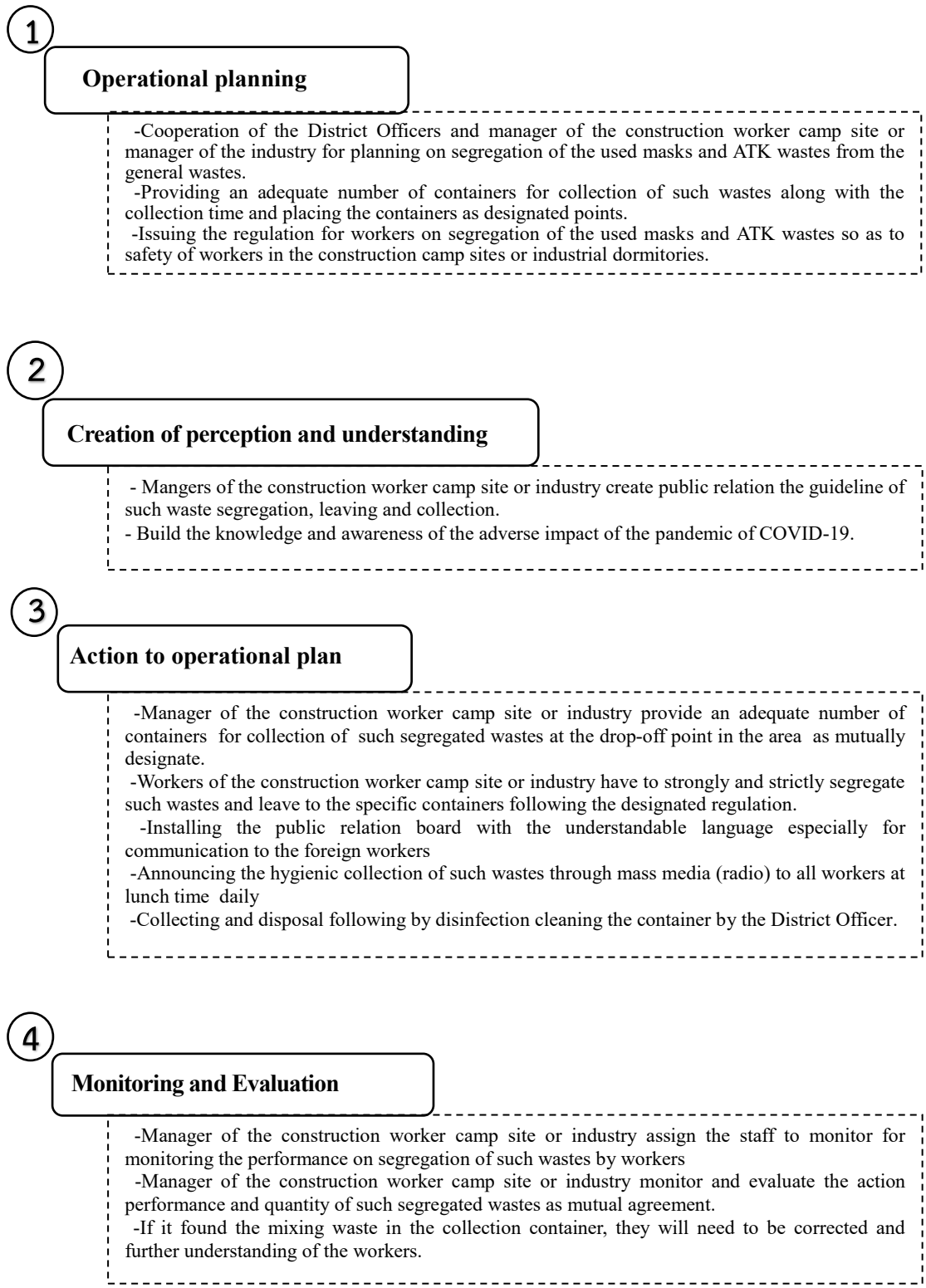


Figure 8 Operational of Used Masks and ATK Wastes Collection in the Construction Worker Camp Site and Industrial Dormitory by Participatory Process

Conclusion

Segregation of the used masks and ATK wastes of communities or construction worker camp sites or industrial dormitories or housing area located in the industry would be successful by participatory process of people resided in the communities, workers in the construction worker camp sites or industrial dormitories. Firstly, it had to begin with the public relation and communication to those people and workers on the benefit of segregation of such wastes in order to be safety of themselves and other people/workers. The community leaders/committee or mangers of the construction worker camp sites or industrial dormitories were the principal ones who play very important role on raising awareness and knowledge with regularly emphasis for the productive segregation of the used masks and ATK wastes as designated tasks without mixing with general wastes. Secondly, there is an adequate number of collection containers for the segregate wastes provided and placed at the suitable locations as mutual agreement with the community people or workers. Thirdly, the District Officer have to collect the segregated wastes according with the appointed time and frequency, then clean the containers with disinfectant solution to make sure that the containers are well taken care. Fourthly, the important factor is the community leader or mangers of the construction worker camp sites or the industrial dormitories have to regularly monitor the mission on segregation of the used masks and ATK wastes. If it is found that wastes leave to the wrong container, the explanation and communication have to be made for more understanding on segregation of the used masks and ATK wastes for the stakeholders to make a success for human safety and living under the crisis of COVID-19 pandemic.

Acknowledgement

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