



RESEARCH ARTICLE

Solid waste management in non-state armed group-controlled areas of Syria case study “Daret Azza and Atareb sub-district”

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ABSTRACT

The purpose of this study (technical assessment) is to understand the effect of the Syrian crisis on the solid waste management (SWM) sector in Non-State Armed Group (NSAG) controlled areas and define the worst communities located in Daret Azza and Atareb subdistrict (DAAS)/Aleppo governorate of Syria. The assessment showed that: SWM sector in general is not supported from Non-governmental organizations (NGOs) in a good way so the environment is polluted and cutaneous leishmaniasis registered cases increased and a huge number of the cases were registered during the fourth months of 2018. The number of communities of DAAS is forty and the population is about 275740 persons (of them 110016 internal displaced persons (IDPs)) live in it, all these local councils do not receive or supported by SW equipment, tools and machines, The SWM of Majbineh, Balenta, Bshantara, Bishqatine, Mezanaz, Arnaz, Qanater, Western Kafr Jum and Arhab is considered the worst in DAAS. The total volume of MSW production of DAAS is 386.72 m³ day⁻¹ and the total quantity is 77344 kg day⁻¹ and the average value SW production per capita for DAAS is : 0.28 kg day⁻¹, All the landfills of DAAS are not sanitary and could be considered a randomly dumps. The maximum Cutaneous leishmaniasis cases are at Western Kafr Jum: 738 cases in the fourth months of the 2018 year, which is considered so risky, the root cause of this case related to the bad SWM.

Keywords: Atareb, Daret Azza, solid waste, The Syrian crisis

1. INTRODUCTION

Environmental pollution has affected the human world since early times and is still growing due to excessive growth in developing countries. Municipal solid waste (MSW) normally is a product of human activities [1]. MSW is usually generated from human settlements, small industries, and commercial activities. Solid waste generation is a natural phenomenon and the amount of waste produced is directly proportional to population growth. Less population means less quantity of MSW [2]. Also MSW is usually considered as the waste that is generated from human settlements, small industries, commercial and municipal activities [2] the general sources of MSW are showed in Table 1.

The amount of MSW in a region is not only a function of the living standard, but also the lifestyle and socioeconomic status of the residents living there [4]. Though solid waste management (SWM) is one of the

mandatory functions for improvement of urban lifestyle [5], An integrated SWM is one of the major challenges for sustainable development [6].

Municipal solid waste management (MSWM) projects are intended to contribute to livelihoods stabilization through the creation of temporary employment opportunities as well as environmentally and economically sustainable livelihoods opportunities for crisis-affected men and women. This is not just a livelihood intervention; it also strengthens the service delivery of the local governments and works towards fostering the relationship between the State and society [7].

In developing countries such as Syria open randomly dumpsites are common, because of the low budget for waste disposal. It also could be a serious threat to groundwater resources and soil, the contamination of soil by heavy metal can cause adverse effects on human health, animals and soil productivity [8, 9]. The Syrian conflict has enveloped the entire country

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and led to mass-scale destruction at all levels of society: socially, economically and civilly. The conflict has led to one of the worst humanitarian crises of modern history, leaving an impact on the most

vulnerable populations of women and children. Basic services are no longer operating, thereby multiplying the suffering Syrians continue to face daily [10].

Table 1. The general sources of MSW [2]

Source	Activities, typical amenities, or locations where wastes are generated	Types of SW
Residential	Single-family and multi-family home, low, medium, and high-rise apartments, etc.	Food wastes, rubbish, paper waste, ashes, special wastes.
Commercial and institutional	Warehouses, restaurants, markets, office buildings, hotels, shopping malls, schools, print shops, auto repair shops, medical facilities and institutions, prisons.	Food wastes, rubbish, ashes, demolition and construction wastes, special wastes, occasionally hazardous wastes.
Open areas	Streets, alleys, parks, vacant lots, playgrounds, beaches, highways, recreational areas, marriage halls, etc.	Street sweepings, roadside litter, rubbish, and other special wastes.
Treatment plant sites	Water, sewage and industrial waste water treatment processes.	Treatment plant sludges.

SWM systems in Syria are overloaded with the high influx of internally displaced persons (IDPs) destruction and/or damages of basic infrastructure [11], and the equipment and heavy machinery normally used for SWM are often looted, destroyed, and not functioning due to the need of new spare parts and maintenance. This contributes to large amounts of garbage piled up in the streets, deteriorating the environmental and health situation and further exacerbating difficult living conditions [11].

At NSAG controlled areas of Syria, the local councils which are because a local authority, these local councils always face difficulties during their work due to lack of the fund, and the main resource of their fund is a grant from local and international NGOs especially which have registration in Turkey, SWM services are primarily provided by local authorities in most parts of Syria and usually provide a basic level of service. However, due to the lack of comprehensive disposal strategies and operational challenges, efforts are

needed in specific rural and urban communities to strengthen and upgrade the quality and regularity of solid waste collection (SWC) [10].

Before the start of conflict in Syria in 2011, nearly 80% of population in Syria were served by well-developed, state-owned, centrally-managed SWM which related to ministry of local administration and environment, the municipality of each village, town, and city is responsible for SWM, The solid waste collection (SWC) method were assessed in 2017 by the collaborative effort of the Whole of Syria coordination team, water, sanitation and hygiene (WASH) partners, From Syria, Turkey, Jordan, Iraq and Lebanon Humanitarian Hubs [12], Table2 showed collection methods and its percentage for Atareb and Daret Azza subdistrict [12].

The MSW of Syria contains a large component of organic matter so it could be a resource for producing a compost an example is MSW of Aleppo city which contain 58% organic matter as showed in the Table (3) [13].

Table 2. Solid waste collection methods and its percentage of Atareb and Daret Azza subdistrict

Subdistrict	Solid waste disposed of household to a dumping location	Solid waste left in public areas	Public solid waste collection free
Atareb	7.36%	2.11%	90.53%
Daret Azza	0.00%	0.00%	100%

Table 3. The average percentage of MSW in Aleppo city

Organic matter	Plastic and rubber	Papers	soil	Metals	Glass	wood	Other
58%	14%	13%	0%	1%	7%	4%	4%

The author hopes from this research to give a deep understanding about the situation of SWM in the NSAG controlled areas of Syria, these areas suffer from the lack of financial resources to conduct a good SWM, the goals of this research are:

1-Determine the amount of the solid waste generated in the NSAG controlled areas of Syria, a case study

“Daret Azza and Atareb sub-district which located in Aleppo governorate.

2-Determine the quantity and the volume of MSW of some communities of Daret Azza and Atareb subdistrict.

3-Determine the urgent needs and the budget for SWM of Daret Azza and Atareb subdistrict.

4-Get a deep understanding about SWM of Non-State Armed Group (NSAG) controlled areas of Syria.

2. MATERIALS AND METHOD

This research focuses on DAAS which located on Jebel Saman district at Aleppo governorate of Syria as showed in Fig 1, which is located in NSAG-controlled areas since the end of 2012. the total number of populations is about 109612 persons (50942 IDPs, 58670 local people) in Daret Azza, and Atareb 166128 (59074 IDPs, 107054 local people) as showed in Table 4 [14], According to Assistance Coordination Unit (ACU) reports: during the first fourth months of 2018 the number of Cutaneous leishmaniasis registered cases were: 1583 at Atareb and, 422 at Daret AZZA subdistrict [15]. Fig 2 showed some pics of SWM of Daret Azza and Atareb subdistrict.



Fig 1. Aleppo governorate and Daret Azza and Atareb subdistrict location (yellow color)

Syrian Engineers for Construction and Development (SECD) conducted a WASH response for IDPs in the north of Syria, during this response SECD team conducted a deep technical assessment for solid waste services sector at the communities of Atareb and Daret Azza using questioners, and physical measures in the field. The assessment was conducted by the author and ten technical engineers from SECD team in addition to thirty-nine local councils of the targeted area are involved in the study.

The SW system of DAAS as all other subdistricts of Syria consists of the following parts: SWC

- 1) SW containers.
- 2) Tractors with a trailer for solid waste collection (SWC).
- 3) SW compactor which is used only in big cities.
- 4) Randomly open dump for final disposal of SW.

All communities of DAAS use tractor with a trailer for SWC and also only two communities use Solid waste compactor in addition to the tractors with trailers.



Fig 2. Some pics of SWM of Daret Azza and Atareb subdistrict

3. RESULTS AND DISCUSSION

The technical and need assessments were conducted by the author and SECD team during March and April of 2018 for SW system for all the communities which located in DAAS. The results of the assessment are shown in Tables 5, 6, 7, 8, 9 and Table 10.

Table 4. The total number of populations of Daret Azza subdistrict communities

District	Sub- district	Community	Population
Jebel saman	Daret Azza	Hur	3474
Jebel saman	Daret Azza	Tqad	8067
Jebel saman	Daret Azza	Arhab	3359
Jebel saman	Daret Azza	Majbineh	2674
Jebel saman	Daret Azza	Bsartun	5500
Jebel saman	Daret Azza	Anjara	12754
Jebel saman	Daret Azza	Zarzita	4030
Jebel saman	Daret Azza	Hoteh	8384
Jebel saman	Daret Azza	Bshantara	1265
Jebel saman	Daret Azza	Bishqatine	1174
Jebel saman	Daret Azza	Kafrantin	225
Jebel saman	Daret Azza	Qabtan Eljabal	4811
Jebel saman	Daret Azza	Daret Azza	43320
Jebel saman	Daret Azza	Deir Saman	7000
Jebel saman	Atareb	Balenta	3575
Jebel saman	Atareb	Mezanaz	2,604
Jebel saman	Atareb	Halazon	2,124
Jebel saman	Atareb	Arnaz	740
Jebel saman	Atareb	Sheikh Ali	4,863
Jebel saman	Atareb	Qanater	2,189
Jebel saman	Atareb	Little Orm	2,086
Jebel saman	Atareb	Babka	3,385
Jebel saman	Atareb	Tadil	2,921
Jebel saman	Atareb	Maaret Atarib	3,975
Jebel saman	Atareb	Abin Samaan	9,028
Jebel saman	Atareb	Jeineh	7,053
Jebel saman	Atareb	Western Kafr Jum	4,502
Jebel saman	Atareb	Kafr Amma	3,980
Jebel saman	Atareb	Kafr Naseh Elatareb	4,903
Jebel saman	Atareb	Kafr Taal	6,061
Jebel saman	Atareb	Kafr Thoran	6,840
Jebel saman	Atareb	Tuwama	6,996
Jebel saman	Atareb	Sahara	6,856
Jebel saman	Atareb	Batbu	8,050
Jebel saman	Atareb	Big Orm	5,820
Jebel saman	Atareb	Abzemo	8,781
Jebel saman	Atareb	Oweijel	6,001
Jebel saman	Atareb	Kafr Aleppo	8,790
Jebel saman	Atareb	Kafr Karmin	7,980
Jebel saman	Atareb	Atareb	27,298
Jebel saman	Atareb	Kafr Naha	12,302
Total			275740

Table 5. The Availability of instruments and machines of SWM of the communities of DAAS

Community	Number of workers	Number of tractors with trails	Number of SW container	A Volume of a SW container (m3)	Number of SW compactor
Hur	3	1	0	0	0
Tqad	12	1	20	1	0
Arhab	0	0	0	0	0
Majbineh	4	0	20	0.5	0
Bsartun	6	1	25	1	0
Anjara	20	4	100	1	1
Zarzita	0	1	0	0	0
Hoteh	5	1	50	1	0
Bshantara	0	0	0	0	0
Bishqatine	0	0	30	0.5	0
Kafrantin	4	1	8	1.5	0
Qabtan aljabal	6	2	0	0	0
Daret Azza	27	2	80	2	2
Deir Saman	5	1	2	2	0
Balenta	3	0	0	0	0
Mezanaz	0	0	0	0	0
Halazon	5	1	0	0	0
Arnaz	0	0	0	0	0
Sheikh Ali	3	1	0	0	0
Qanater	0	0	0	0	0
Little Orm	10	1	0	0	0
Babka	6	1	0	0	0
Tadil	4	1	0	0	0
Maaret tarib	5	1	0	0	0
Abin Samaan	6	1	0	0	0
Jeineh	10	1	0	0	0
Western Kafr Jum	0	0	0	0	0
Kafr Amma	5	1	0	0	0
Kafr Naseh Elatareb	5	1	0	0	0
Kafr Taal	10	1	3	0.25	0
Kafr Thoran	15	2	0	0	0
Tuwama	5	1	200	0.1	0
Sahara	6	1	0	0	0
Batbu	12	2	200	0.2	0
Big Orm	12	2	0	0	0
Abzemo	13	1	80	0.1	0
Oweijel	5	1	10	0.25	0
Kafr Aleppo	4	1	0	0	0
Kafr Karmin	15	2	0	0	0
Atareb	40	3	200	0.6-1	2
Kafr Naha	6	2	0	0	0

Table 6. The Availability of support for SWM of of the communities of DAAS

Community	Availability of support		
	Salaries for workers	Fuel for SW vehicle	Equipment and stationaries
Hur	0	Yes	0
Tqad	0	Yes	0
Arhab	0	0	0
Majbineh	0	0	0
Bsartun	0	0	0
Anjara	Yes	Yes	0
Zarzita	0	Yes	0
Hoteh	0	0	0
Bshantara	0	0	0
Bishqatine	0	0	0
Kafrantin	0	0	0
Qabtan Eljabal	0	Yes	0
Daret Azza	0	Yes	0
Deir Saman	0	Yes	0
Balenta	0	0	0
Mezanaz	0	0	0
Halazon	0	0	0
Arnaz	0	0	0
Sheikh Ali	0	Yes	0
Qanater	0	Yes	0
Little Orm	Yes	0	0
Babka	Yes	0	0
Tadil	Yes	0	0
Maaret Atarib	Yes	0	0
Abin Samaan	0	0	0
Jeineh	0	Yes	0
Western Kafr Jum	0	0	0
Kafr Amma	0	0	0
Kafr Naseh Elatareb	0	0	0
Kafr Taal	0	Yes	0
Kafr Thoran	0	0	0
Tuwama	0	0	0
Sahara	0	Yes	0
Batbu	Yes	0	0
Big Orm	Yes	0	0
Abzemo	Yes	Yes	0
Oweijel	0	Yes	0
Kafr Aleppo	0	Yes	0
Kafr Karmin	Yes	Yes	0
Atareb	Yes	0	0
Kafr Naha	0	0	0

Table 7. The SWC methods of the communities of DAAS

Community	SW disposed of by household to a dumping location	% SW amount left in public areas without collection and disposal (%)	% SW collection free by the local council (%)
Hur	0	0	100%
Tqad	0	0%	100%
Arhab	0	34%	66%
Majbineh	0	26%	74%
Bsartun	0	0	100%
Anjara	0	0	100%
Zarzita	0	0	100%
Hoteh	0	0	100%
Bshantara	0	25%	75%
Bishqatine	0	0	100%
Kafrantin	0	0	100%
Qabtan Eljabal	0	0	100%
Daret Azza	0	0	100%
Deir Saman	0	0	100%
Balenta	0	0	100%
Mezanaz	0	36%	64%
Halazon	0	0	100%
Arnaz	0	0	100%
Sheikh Ali	0	0	100%
Qanater	0	0	100%
Little Orm	0	50%	50%
Babka	0	0	100%
Tadil	0	0	100%
Maaret Atarib	0	0	100%
Abin Samaan	0	0	100%
Jeineh	0	0	100%
Western Kafr Jum	0	0	100%
Kafr Amma	0	0	100%
Kafr Naseh Elatareb	0	0	100%
Kafr Taal	0	0	100%
Kafr Thoran	0	0	100%
Tuwama	0	0	100%
Sahara	0	0	100%
Batbu	0	0	100%
Big Orm	0	0	100%
Abzemo	0	0	100%
Oweijel	0	0	100%
Kafr Aleppo	0	0	100%
Kafr Karmin	0	0	100%
Atareb	0	0	100%

Table 8. The solid waste collection frequency (SWCF) of the communities of DAAS

Community	(SWCF)		
	More than 3 times per week	Once a week	Once every two weeks or more
Hur	Yes	0	0
Tqad	Yes	0	0
Arhab	0	Yes	0
Majbineh	0	Yes	0
Bsartun	Yes	0	0
Anjara	Yes	0	0
Zarzita	Yes	0	0
Hoteh	Yes	0	0
Bshantara	0	Yes	0
Bishqatine	0	Yes	0
Kafrantin	Yes	0	0
Qabtan Eljabal	Yes	0	0
Daret Azza	Yes	0	0
Deir Saman	Yes	0	0
Balenta	0	Yes	0
Mezanaz	0	0	Yes
Halazon	Yes	0	0
Arnaz	0	0	Yes
Sheikh Ali	Yes	0	0
Qanater	0	0	Yes
Little Orm	Yes	0	0
Babka	Yes	0	0
Tadil	Yes	0	0
Maaret Atarib	Yes	0	0
Abin Samaan	Yes	0	0
Jeineh	Yes	0	0
Western Kafr Jum	0	0	Yes
Kafr Amma	0	Yes	0
Kafr Naseh Elatareb	Yes	0	0
Kafr Taal	Yes	0	0
Kafr Thoran	Yes	0	0
Tuwama	0	Yes	0
Sahara	Yes	0	0
Batbu	Yes	0	0
Big Orm	Yes	0	0
Abzemo	Yes	0	0
Oweijel	Yes	0	0
Kafr Aleppo	Yes	0	0
Kafr Karmin	Yes	0	0
Atareb	Yes	0	0
Kafr Naha	Yes	0	0

Table 9. The quantity, the volume of SW of the communities of DAAS

Community	MSW production (m ³ day ⁻¹)	Quantity of MSW (kg day ⁻¹)	Quantity of MSW (kg cap ⁻¹ day ⁻¹)
Hur	5.4	1080	0.31
Tqad	9.9	1980	0.25
Arhab	3	600	0.18
Majbineh	2.95	590	0.22
Bsartun	5	1000	0.18
Anjara	14.5	2900	0.23
Zarzita	7.9	1580	0.39
Hoteh	6.1	1220	0.15
Bshantara	3.8	760	0.60
Bishqatine	3	600	0.51
Kafrantin	0.7	140	0.62
Qabtan Eljabal	11.8	2360	0.49
Daret Azza	100	20000	0.46
Deir Saman	6.9	1380	0.20
Balenta	2	400	0.11
Mezanaz	2.85	570	0.22
Halazon	2.13	426	0.20
Arnaz	0.48	96	0.13
Sheikh Ali	2.93	586	0.12
Qanater	1.1	220	0.10
Little Orm	2.45	490	0.23
Babka	2.95	590	0.17
Tadil	2.91	582	0.20
Maaret Atarib	7.89	1578	0.40
Abin Samaan	11.2	2240	0.25
Jeineh	11.7	2340	0.33
Western Kafr Jum	2.2	440	0.10
Kafr Amma	2.6	520	0.13
Kafr Naseh Elatareb	4.9	980	0.20
Kafr Taal	9.8	1960	0.32
Kafr Thoran	5.61	1122	0.16
Tuwama	8.1	1620	0.23
Sahara	9.9	1980	0.29
Batbu	9.2	1840	0.23
Big Orm	17	3400	0.58
Abzemo	14.3	2860	0.33
Oweijel	4.8	960	0.16
Kafr Aleppo	9.89	1978	0.23
Kafr Karmin	24.3	4860	0.61
Atareb	21.2	4240	0.16
Kafr Naha	11.38	2276	0.19

Table 10. The distance between the center community and the nearest landfill, and Cutaneous leishmaniasis cases of the communities of DAAS

Community	The distance between the center of community and nearest the landfill (km)	Registered Cutaneous leishmaniasis cases during 2018 (ACU, EWARN 2018)
Hur	2	15
Tqad	1.5	33
Arhab	2	NA
Majbineh	3	NA
Bsartun	1	N/A
Anjara	2	194
Zarzita	3	N/A
Hoteh	2	N/A
Bshantara	2	N/A
Bishqatine	4.5	N/A
Kafrantin	10	N/A
Qabtan Eljabal	2	101
Daret Azza	9	79
Deir Saman	8	N/A
Balenta	12	N/A
Mezanaz	1.5	2
Halazon	3	N/A
Arnaz	1	N/A
Sheikh Ali	2	49
Qanater	0.2	N/A
Little Orm	0.5	N/A
Babka	6	N/A
Tadil	2	N/A
Maaret Atarib	2	N/A
Abin Samaan	4	424
Jeineh	1	175
Western Kafr Jum	1	738
Kafr Amma	2	N/A
Kafr Naseh Elatareb	10	N/A
Kafr Taal	2	52
Kafr Thoran	5	20
Tuwama	1	N/A
Sahara	2	42
Batbu	2	N/A
Big Orm	1.5	0
Abzemo	2	45
Oweijel	2.5	N/A
Kafr Aleppo	1	N/A
Kafr Karmin	0.8	31
Atareb	4	5
Kafr Naha	2	N/A

1- About twenty-six communities (123455 persons) of DAAS do not have SW containers which are necessary for SWC, this is considered an evidence of the bad state of SWM, local councils do not have enough resources for buying SW containers, the cost of each one is about 70 \$ with capacity 0.5 m³ that can serve 200-300 persons.

2- The number of local councils DAAS is forty, and all these local councils do not receive or supported by SW equipment, tools and machines, and only fourteen local councils (hosted 105407 persons) supported by salaries for the worker of SWM from NGOs, this support is not sustainable, also only 16 local councils (hosted 142030 persons) supported by fuel from SECD for SW vehicles this support also is not sustainable it is an emergency support only for 3months. In general SW sector is not supported from NGOs in a good way so the environment is polluted and cutaneous leishmaniasis registered cases increased and a huge number of it was registered during the fourth months of 2018 [13].

3-The SWM of Balenta, Majbineh, Bshantara, Bishqatine, Mezanaz, Arnaz, Qanater, Western Kafr Jum and Arhab is considered so bad because these local councils do not have tractors with trailers for SWC and do not have dedicated workers for SWC and disposal, also SWCF is Once per a week which considered is too low, in emergency conditions the SWCF must be at least two times per a week [16].

4- The local council of DAAS conducts SW as public free because 85% of the people inside Syria live under the line of poverty and do not have enough resources.

5-SWCF values differ from one community to other, the SWCF of 30 communities is at least 3 times per week which hosted 242682 persons (88.01% of total people live at DAAS), and once week of 7 communities which hosted 23023 persons (8.35% of total people live at DAAS) and Once every two weeks or more of 4 communities (Mezanaz, Arnaz, Qanater and Western Kafr Jum) (10035 persons 3.64%) (of total people lives at DAAS) as shown in the Fig 3 and the Fig 4, before the crisis of Syria at 2011, The SWC was performed daily by the local council, the SWCF once per a week consider is low, it must be at least two times per a week in the crisis [16].

6-Most of the local councils DAAS do not have enough support for conducting SWM so

the registered cutaneous leishmaniasis cases of these subdistricts are so big.

7-The total volume of MSW production of DAAS is 380.5 m³ day⁻¹ and the total quantity is 76100 kg day⁻¹. The average, maximum and minimum of SW production per capita at DAAS communities is (1.36, 3.11, 0.49) L day⁻¹ and (0.27, 0.62, 0.1) kg day⁻¹ and the average SW production per capita value for DAAS is: 1.42 L day⁻¹, 0.28 kg day⁻¹, these values are similar to the value recognized by the world bank [17]. It is known that the amount of solid waste changes depending on the economical and cultural living conditions and also seasonal changes [18]. It is highly recommended to establish a general management of solid waste for DAAS to achieve a best service of SWM

and use the available resources in a good way and take a benefit of the studies which related to the developing countries to convert solid waste into useful products, such used rubber tire pyrolysis of waste tire rubber to produce liquid fuel. [19], recycling of waste plastics for utilization it as an energy source [20] and Biodiesel production from waste oils [21].

8-There are 24 random landfills of DAAS. which considered a spot of pollution, resources of bad odors and one of the roots causes of cutaneous leishmaniasis, in other hand the average, maximum and minimum distances between the center of the community and the nearest random landfill are (2.9, 12, 0.2) km respectively, it is highly recommended that only one or two sanitary landfills be conducted for DAAS instead of 24 random landfills.

9-The maximum Cutaneous leishmaniasis cases is at Western Kafr Jum: 738 cases in the fourth months of the 2018 year [13], which is considered so big, the route causes of this issue are: solid waste containers are not available, there are not dedicated workers for SWC and disposal, and the solid waste collection is conducted one time per week , So Western kafr jum need urgent assistances to establish strong solid waste management .

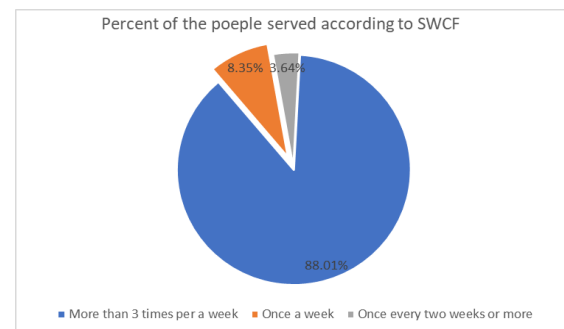


Fig 3. Percent of served people according to SWCF

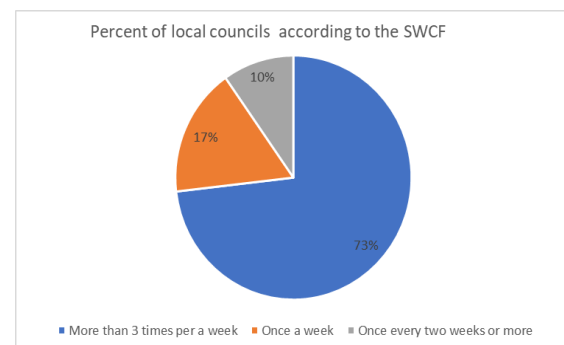


Fig 4. Percent of the local councils and people served according to SWCF

4. CONCLUSIONS

The SWM management of NSAG controlled areas considered very bad because of the shortage of financial resources, so the environment polluted and the cutaneous leishmaniasis increases day by day. The local councils of NSAG area need urgent support and training for operation SWM in a good way. Effective SWC will reduce the cutaneous leishmaniasis cases and the pollution of the environment.

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