Feasibility Study :

Mawsynram Community and Rural Development Block
Public Health Engineering Water Supply Schemes
Under Special Purpose Vehicle Society Funding

Meghalaya Basin Development Authority
Shillong
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Abbreviations

HH	-	Household
INR	-	Institute of Natural Resources
Lpcd	-	Litres Per Capita per Day
MBDA	-	Meghalaya Basin Development Authority
MCM	-	Million Cubic Metre
MIG	-	Meghalaya Institute of Governance
SPVS	-	Special Project Vehicle Society
TP	-	Treatment Plant
WSS	-	Water Supply Scheme.

Forward

This study was conducted by the Meghalaya Basin Development Authority through its intermediaries, the Meghalaya Institute of Governance and the Institute of Natural Resources. The recommendations are aimed at augmenting the existing water schemes of various villages within the Mawsynram C&RD Block so that the residents of the villages receive sufficient water supply for domestic use as well as for other purposes in order to bring about overall sustainable socio-economic improvement in the village.

CHAPTER 1. INTRODUCTION

This feasibility study is meant for the Water Supply Scheme of a number of villages in Mawsynram C&RD Block, namely Lawbah, Synnei, Mawkhan – Mawdon, Mawtepiew, Laitsohum, Dewsaw villages to be implemented by the Public Health Engineering Department, Government of Meghalaya under the Special Project Vehicle Society (SPVS) funding.

1. WATER USE IN MAWSYNRAM C&RD BLOCK

Of the total area of Mawsynram block, 1227.55 ha is irrigated while still 3144.55 ha remains un-irrigated or totally rain fed[1].It has a total of 1494.54 ha command area, of which 993.23 is developed while 456.31 ha is undeveloped[2]. 1371.34 ha of area in the block is irrigated by government canals[3].Mawsynram demands 3.00 MCM of water for domestic consumption at 2016 but has been projected to grow to 3.30 MCM in 2020[4]. For crop water Mawsynram Block needs 56.40 MCM in 2016 and is projected to be 58.93 MCM in 2020[5].Mawsynram C&RD Block needs 0.44MCM for livestock activities, and projected to grow to 0.50 MCM in 2020[6]. Its industrial activities demand 0.000406 MCM and projected to grow to 0.000487 MCM in 2020[7].

2. OBJECTIVE OF THE STUDY

The objective of the study is to:

- Examine the feasibility of the proposed project of the PHE Dept. under the SPVS funding.

[1](NABCONS 2017) p. 53
[2] Ibid pp.62-63
[3] Ibid pp.64-65
[4] Ibid p. 69
[5] Ibid p. 73
[6] Ibid p. 75
[7] Ibid pp.78-79

3. RESEARCH METHODS

The research study involved the use of baseline data as well as data collected on the existing water sources in the village. PRA exercise was conducted, including Social Mapping, Resource Mapping and Seasonality Calendar. Physical verification of the proposed water source of each village was conducted. The discharge, altitude, and distance of the water source and that of the village was recorded.

Secondary information and desk research was done prior to the field research. Where ever necessary Census Report (2011), the District Irrigation Plan, East Khasi Hills and the Detailed Project Reports, etc. were referred to.

Table 1 Date of Village Visits

Sl. No.	**Name of Village**	**Date of Visit**
1.	Synnei	15.01.2018
2.	Dewsaw	15.01.2018
3.	Mawkhan – Mawdon	17.01.2018
4.	Mawtepiew	17.01.2018
5.	Laitsohum	18.01.2018
6.	Lawbah	18.01.2018

CHAPTER 2. SUMMARY OF FINDINGS

The following are the main findings from all villages proposed.

Present Condition of Villages and their WSS'

1. The present water supply in these villages is inadequate to meet the growing needs and demands of these villages due to population growth and decrease in discharge of water from the sources. Some villages such as Synnei, Mawtepiew and Laitsohum face acute water shortage.
2. Immediately the situation can be improved by repairing of existing water tanks and pipelines in the village.
3. Due to population growth which resulted in the increase in demand for water the WSS is inadequate.
4. All villages studied face acute water shortage during the winter months between December to April
5. The main diseases related to water which the villages suffer from are skin diseases and diarrhoea

Agriculture and Other Economic Activities

6. Most of the village respondents are involved in agricultural activities. The main crops cultivated in these villages are broom grass, bay leaf, pepper and piper.
7. During the discussion with some village elders the long term negative impact of broom-grass cultivation was highlighted. However, owing to over-dependence on this crop as it ensures faster returns farmers are reluctant to replace it with another crop.
8. In all the villages the people are open to new interventions and new ideas to replace high water consuming crops with more sustainable, eco-friendly crops that can bring better remuneration in the long run.

Proposed WSS

9. All water sources selected occur naturally in which the discharge varies from pre to post monsoon.

Village Specific Observations

10. In **Dewsaw and Synnei villages** there is a strong cohesion in the villages. Households that have better earning capacity and can afford their own water connection drawing from nearby springs willingly share the same with their immediate neighbours.
11. Also, in **Dewsaw and Synnei villages** relatively better off HHs are very accommodating. If there is any construction work that is required by a particular household, the work is sub-contracted to the workforce from within the village even if they have to postpone the work owing to pre-occupation of the village workforce. This practice helps in conservation of resources within the village.
12. **Laitsohum village** has no PHE water supply as yet.
13. The water source for **Laitsohum WSS** is at a lower elevation with respect to the village. As such it is proposed that a suitable motor pump be installed to convey water to the village.

CHAPTER 3. RECOMMENDATIONS

All villages the team visited – with varying water stress levels do need the proposed WSS prepared by the PHE Dept.

Based on the findings the following are the recommendations proposed.

General Recommendations for all Water Supply Scheme:

1. An undertaking from the village for taking up afforestation, environment protection and protection of water sources.
2. Protection of the catchment area in and around the source to ensure their sustainability.
3. Encourage the villagers who are currently dependent on broom grass to progressively reduce the acreage of cultivation.
4. Afforestation projects need to be taken up intensely to increase productivity and longevity of the water sources.
5. Take up plantation of suitable, valuable medicinal and aromatic plants
6. Tapping of the discharge-water by construction of chambers and collection tanks
7. Being a natural source arising from the sub-surface aquifer, recharging the ground water by means of low cost intervention works, must be carried out simultaneously.
8. Existing water supply under the PHE Dept., to be repaired and maintained.
9. The existing water tanks' storage capacity should be increased.
10. Reservoirs to store surface rainfall during water surplus months should be constructed with appropriate technology.
11. Rain water harvesting techniques should be encouraged as this village has water surplus during the monsoon. In this regard, it is suggested that MBDA/ other line Depts. be involved.
12. Judicious planning for ground water resource development.

13. Capacity building for certain able village residents who can maintain the water supply units themselves.
14. Capacity building of village residents to re-utilise grey water for other purposes such as in toilets, in kitchen gardens, etc.
15. Measures should be taken to ensure soil conservation as it was seen that agricultural productivity had dropped in the recent past.
16. Community herbal gardens in all villages according to topography and soil, suitable herbal plants may be introduced.
17. Alternative food grains with higher nutritional content may be introduced such as millets which historically was a major food grain for the people of the region.

Project Specific Interventions for Mawkhan – Mawdon WSS

18. As regards to the twin villages of Mawkhan-Mawdon in which two separate WSS proposals were prepared by the PHE Dept., the team is of the opinion that a single WSS be considered (1 TP, 1 Reservoir and separate distribution lines).
19. The water source of Mawkhan – Mawdon discharges sufficient supply which can be also be used for micro-hydel project.

Project Specific Intervention for Laitsohum WSS

20. Use of sustainable energy sources such as solar pump for the pumping of water for supply to the WSS be introduced in Laitsohum village.

Project Specific Intervention for Synnei WSS

21. Construction of collection chambers at the spring sites to store/conserve surplus water during the monsoon.
22. It is also recommended that there be ground water recharge (e.g. through recharge pits) introduced so as to maintain the spring water from the proposed water source.

Project Specific Intervention for Mawtepiew WSS

23. As the source of the proposed water scheme is nearly 5 kms away from the village, it is recommended that more than one TP be built certain distances apart.

CHAPTER 4. SYNNEI WATER SUPPLY SCHEME

Synnei is a village in the East Khasi Hills District of Meghalaya. It falls in the Mawsynram C& RD Block. Synnei can be located at 25.253826°N and 91.608102°E and at an elevation of 568m. Synnei village is divided into two localities Synnei Nongrim and Synnei Nongthymmai.

Figure 1 Proposed Water Source for Synnei WSS

1. SYNNEI VILLAGE DEMOGRAPHY AND HOUSEHOLDS

As per the Census of India (2011). Synnei has 77HH (Synnei Nongrim – 48HH; Synnei Nongthymmai – 29HH). It has a population of 346 persons (Synnei Nongrim – 195 persons; Synnei Nongthymmai-151 persons). It has 173

males (Synnei Nongrim – 97 males; Synnei Nongthymmai – 76 persons). It has 173 females (Synnei Nongrim – 98 females; Synnei Nongthymmai -75 persons). 634 of whom are males and 646 are females. However, As per the interaction the team had with the Village Executive Committee in 2016 there were 70HHs and in 2017 the number of HHs had gone up to 77. The village grows at about 3-4HHs a year. There are 11 Women Headed Households (WHH) in the year 2017. There are no landless families in the village.

2. OCCUPATIONAL PROFILE OF SYNNEI VILLAGE

It is an agricultural village which mostly grows bay leaf and broom grass. There are some villagers involved in animal husbandry (cow-22 HH; poultry -40 HH and piggery – 20 HH). Every household earns below Rs. 20,000 per annum.

3. EDUCATIONAL PROFILE OF SYNNEI VILLAGE

As per the Census of India (2011) 82% of its population is literate.

4. STATUS OF WATER RELATED HEALTH ISSUES IN SYNNEI VILLAGE

Skin problems are the most prevalent water related diseases in the village. Cholera is the next prevalent disease in the village followed by diarrhoea and malaria.

5. BASIC FACILITES IN SYNNEI VILLAGE

Table 2 Basic Facilities in Synnei Village

Basic Facility		Presence		
		Yes	Nos.	No
Govt. Offices		-	-	✓
Community Centre		✓	1	-
Places Of Worship		✓	2	-
School	Primary	✓	3	-
	Secondary	-	-	✓
	H. Secondary	-	-	✓
	College	-	-	✓
Anganwadi Centre		✓	2	-
Police Station		-	-	✓
PDS		✓	2	-
Bank		-	-	✓
Medical	Pharmacy	-	-	✓
	Pvt Doctor	-	-	✓
	PHC	-	-	✓
	CHC	-	-	✓
	Local Healer	✓	1	-
Water Sources	PHE Water	✓	1	-
	Springs	✓		-
	Stream	✓	During the Monsoon	-

6. SYNNEI VILLAGE RESOURCE MAP

Table 3 Village Resource Map of Synnei Village

S. No.	Village Land Use	Yes/No	Nos	Area (acres)
1.	Reserve Forest	No	-	-
2.	Community Forest	Yes	1	1
3.	Clan Forest	No	-	-
4.	Private Forest	Yes	100% HHs	-
5.	Sacred Grove	No	-	-
6.	Privately Owned Water Bodies	Yes	10	-
7.	Community Owned Water Bodies	Yes	2	-
8.	Fallow Land	Yes	-	-
9.	Cultivable Waste Land	Yes	-	-
10.	Land Under Miscellaneous Tree Crops	Yes	-	-

7. WATER SOURCES IN SYNNEI VILLAGE

Synnei's water is sourced from a distant village called Phlangmawsyrpat. Phlangmawsyrpat (25.262884°N and 91.59452°E) is located at a higher altitude (1063 m) than the village of Synnei. The water sources of both the existing PHE WSS and the newly proposed SPVS WSS are in Phlangmawsyrpat. The river Wahumiam is about 3 kms away from the village and water from the source is used for washing clothes. There is a difference of 495m in elevation between the village of Synnei and the proposed water source at Phlangmawsyrpat. The source itself, is 1.4 kms away from the village of Synnei. The village also has three springs located in it; Wah Umling, Wahumran and Wahumsohliang which are common properties.

Table 4 Parametres of Synnei Village

Sl. No.	Variable	
1.	Co-ordinates of Village	25.253826˚N
		91.608102˚E
2.	Elevation of Village	568m
3.	Co-ordinates of Proposed Water Source	25.262884° N
		91.594952° E
4.	Elevation of Water Source	1063m
5.	Elevation Difference between Proposed Water Source to Village	495m
6.	Aerial Distance from Source to Village (kms)	1.4

The existing Synnei Water Supply Scheme was sanctioned in 1987-88 by the PHE Dept. It is a gravity fed scheme which has been in existence for about 25 years. The age of the water supply scheme along with the growing population in Synnei has increased water stress in the village and the water supply scheme can hardly provide 40 lpcd.

The existing source is sourced from a small rain fed spring called *Um Sohduit* located at Phlangmawsyrpat whose discharge depends on the amount of rain received. With the decrease in rainfall and the degradation of the catchment area of the source due to deforestation and human activities the discharge from *Um Sohduit* can no longer provide adequate water to the village.

There is a total of 28 PHE water platforms, which are at a distance of .50 – 1 km from each other. Thirteen of the water platforms are in Synnei Nongrim and only 5 of these water platforms are in operation. 15 water platforms are in Synnei Nongthymmai which are all working. 10 households have to collect water with buckets while the rest of the village collects water using plastic pipes. The households which collect water using the plastic pipes become collection centres themselves and distribute the water collected to other houses nearby. Only 10 households use PHE water for drinking, washing and other purposes while the rest of the households mainly use water from the springs.

The village of Synnei is water stressed in winter from December to April. During these months, the households collect water from the springs and collect

about 5 buckets of water per day. While on the other hand, in the summer months the water gets very dirty and the households have to wait till it is clean to collect water.

8. PROPOSED WSS FOR SYNNEI VILLAGE

The new scheme which is proposed to supply water to Synnei village is called the Synnei *Water Supply Scheme* for both the localities of Synnei village. The source of the proposed water supply scheme is from a spring called *Tyllong Umling* which originates from the reserved land and forest of the village which is perennially flowing and which has sufficient water discharge to meet the water demand of Synnei village. The water from the new proposed source *Tyllong Umling* is on the higher reaches (1063m) of the village. This proposed water supply scheme is designed to meet the requirement of the village for 15 years with a projected demand of 701lpcd for house connections and 174lpcd for institution.

9. RECOMMENDATIONS FOR SYNNEI WSS

- It is recommended that the WSS for Synnei village be installed as the village is water stressed.
- It is also recommended that there be ground water recharge (e.g. recharge pits) installed so as to maintain the spring water from the proposed water source.

CHAPTER 5. DEWSAW WATER SUPPLY SCHEME

Dewsaw is a village in the East Khasi Hills District of Meghalaya. It falls under the Mawsynram C&RD Block. Dewsaw is located at 25.251711°N and 91.606830°E and is at an elevation of 1123m.

1. DEWSAW VILLAGE DEMOGRAPHY AND HOUSEHOLDS

According to the Census 2011 it has 19 HHs, a total population of 80 persons of which 46 are males and 34 are females. 64 persons are literate while 16 are classified as non-literate. During the interactions with the Village Headman it was reported that as of the year 2017 there are 67 HHs. It has a total population of 392 persons of which 219 are males and 173 are females.

2. OCCUPATIONAL PROFILE OF DEWSAW VILLAGE

99% of the residents are involved in agriculture and its activities and about 0.2% are salaried persons. Some are involved in petty business and non - agricultural labourer.

3. BASIC FACILITES IN DEWSAW

Table 5 Basic Facilities in Dewsaw Village

Basic Facility		**Presence**		
		Yes	Nos.	No
Govt. Offices		-	-	✓
Community Centre		✓	-	-
Places Of Worship		✓	-	-
School	**Primary**	✓	1	-
	Secondary	-	-	✓
	H. Secondary	-	-	✓
	College	-	-	✓

Anganwadi Centre		✓	-	-
Police Station		-	-	✓
PDS		✓	1	-
Bank		-	-	✓
Medical	**Pharmacy**	-	-	✓
	Pvt Doctor	-	-	✓
	PHC	-	-	✓
	CHC	-	-	✓
	Local Healer	✓	-	-
Water Sour.	**PHE Water**	✓	14	-
	Springs	✓	4	-

4. DEWSAW VILLAGE RESOURCE MAP

Table 6 Dewsaw Village Resource Map

S. No.	Village Land Use	Yes/No	Nos.	Area (acres)
1.	Reserve Forest	No		-
2.	Community Forest	Yes	1	-
3.	Clan Forest	Yes		-
4.	Private Forest	Yes	90%HH	-
5.	Sacred Grove	No		-
6.	Fallow Land	No		-
7.	Cultivable Waste Land	Yes		-
8.	Land Under Miscellaneous Tree Crops	Yes		-
9.	Fish Pond	No		-

5. WATER SOURCES IN DEWSAW

Table 7 Parameters of Dewsaw Village

Sl. No.	Variable	
1.	Co-ordinates of Village	25.251711˚N
		91.606830˚E
2.	Elevation of Village	776m
3.	Co-ordinates of Proposed Water Source	25.261472° N
		91.586449° E
4.	Elevation of Water Source	1123m
5.	Elevation Difference between Proposed Water Source to Village	347m
6.	Aerial Distance from Source to Village (kms)	2.4

The village of Dewsaw is supplied water through a PHE WSS and also from springs present in the village. These springs have water throughout the day during the summer when there is enough rainfall. However, during the winter season it becomes water stressed.

The PHE Dept. has three water tanks which are in a dilapidated condition. The PHE water tank gets water from only one source which is a spring. There are about 16 PHE taps and only 6 are functioning. The water from the PHE WSS is used for drinking, washing and other domestic purposes. During the summer season water is collected from these platforms by individual households.

There are four springs within the village. These springs are less than 500m away from the homestead. The water from these springs is used for washing. However, during the winter season these springs dry up.

6. PROPOSED WSS FOR DEWSAW VILLAGE

The new scheme which is proposed to supply water to Dewsaw village is called the *Dew Water Supply Scheme*. The source of the proposed water supply scheme is from a spring located at 25.261472 ˚N and 91.586449 ˚E and

which is at an elevation of 1123m. The source is in Phlangmawsyrpat which is 2.4 kms from the village

7. RECOMMENDATIONS FOR DEWSAW WSS

- It is recommended that the WSS for Dewsaw village be installed as the village is water stressed.

CHAPTER 6. LAWBAH WATER SUPPLY SCHEME

Lawbah village which is located at 25.230327°N and 91.563362° E and at an elevation of 984m is a part of the East Khasi Hills District of Meghalaya and falls under the Mawsynram C&RD Block.

1. LAWBAH VILLAGE DEMOGRAPHY AND HOUSEHOLDS

As per the Census of India (2011) Lawbah has 231 households. It has a population of 1280 persons; 634 of whom are males and 646 are females. It was reported by the village headman that as of 2017 there were a total number of 299 HHs in Lawbah village.

2. OCCUPATIONAL PROFILE OF LAWBAH VILLAGE

95% of the residents are involved in agriculture and its activities. While the remaining population are salaried persons (2%), some are involved in petty business (2%) and non-agricultural labour (1%).

3. EDUCATIONAL PROFILE OF LAWBAH VILLAGE

As per the Census of India (2011) 76% of its population is literate

Table 8 Educational Profile of Lawbah Village

S. No.	Level Of Education	Population percentage as of 2017
1.	Illiterate	3%
2.	Primary Education	50%
3.	Upper Primary	40%
4.	Secondary Education	3%
5.	Se. Secondary Education	10%
6.	Graduation	5%
7.	Post-Graduation	1%

4. BASIC FACILITIES IN LAWBAH VILLAGE

Table 9 Basic Facilities in Lawbah Village

Basic Facility		Presence		
		Yes	Nos.	No
Govt. Offices		-	-	✓
Community Centre		✓	-	-
Places Of Worship		✓	-	-
School	Primary	✓	3	-
	Secondary	✓	1	-
	H. Secondary	✓	1	-
	College	-	-	✓
Anganwadi Centre		✓	4	-
Police Station		-	-	✓
PDS		✓	1	-
Bank		✓	1	-
Medical	Pharmacy	✓	3	
	Pvt Doctor	✓	-	-
	PHC	-	-	-
	CHC	-	-	✓
	Local Healer	✓	15	-
Water Sour	PHE Water	✓	2	-
	Springs	✓		-

5. LAWBAH VILLAGE RESOURCE MAP

Table 10 Lawbah Village Resource Map

S. No.	Village Land Use	Yes/No	Nos.	Area (acres)
1.	Reserve Forest	No	-	-
2.	Community Forest	Yes	1	1235.53 approx
3.	Clan Forest	No	-	-
4.	Private Forest	Yes	90%HH	-
5.	Sacred Grove	No	-	-
6.	Fallow Land	Yes	-	20
7.	Cultivable Waste Land	Yes	-	10
8.	Land Under Miscellaneous Tree Crops	Yes	20	-
9.	Fish Pond	Yes	10	-

6. WATER SOURCES IN LAWBAH VILLAGE

The village of Lawbah gets water throughout the day during the summer however during the dry winter months from December to March it becomes water stressed. During summers each household gets approximately 250 litres per day, however during winters, each household gets only 20 litres per day.

Figure 2 Proposed Water Source for Lawbah WSS

The lack of water has also caused some disagreements amongst village members.

The PHE Dept. has one water tank which was constructed in 1992 and which is in a dilapidated condition. The PHE water tank gets water from two sources Mawpun and Mawdet. Apart from these there are 32 PHE taps, only half of which are in operation. The water is used for drinking, washing and for other purposes.

There are 4 water tanks constructed under the Watershed Scheme of the Soil and Water Conservation Department. Water to the watershed tanks is sourced from a streamlet. Water from these water tanks are used for domestic consumption.

Water from these water tanks is drawn by individual households from these water platforms on payment of a fee. These HHs have to pay a monthly fee to the Water User Committee for the use of the water. There is a distance of about 20 metres between the water platforms to the households. Most of these platforms are all in a dilapidated condition. The village has constructed areas to wash clothes and a bathing area for its residents.

Table 11 Parametres of Lawbah Villge

Sl. No.	Variable	
1.	Co-ordinates of Village	25.230327˚N
		91.563177˚E
2.	Elevation of Village	915m
3.	Co-ordinates of Proposed Water Source	25.250249° N
		91.560624° E
4.	Elevation of Water Source	984m
5.	Elevation Difference between Proposed Water Source to Village	69m
6.	Aerial Distance from Source to Village (kms)	2.1

There are six springs; 3 are within the village (Tlong, Lawbah Rum, Lawbah Neng) and the other 3 are on the outskirts of the village. These 3 springs outside the village are under 1 km away from the homesteads. The water from these springs is used for washing. During periods of water stress, the water from these springs become extremely important to the village and is used for all types of domestic consumption. The village executive members said that water is cleaner from the springs than the water given by the PHE Department.

7. PROPOSED WSS AT LAWBAH

The new scheme which is proposed to enhance the existing water supply to Lawbah village is called the *Lawbah Water Supply Scheme*. The proposed water source is located at *Umbampuit* stream **(**located at 25.250249˚N and 91.560624˚E**)** which is on a higher altitude (984m). After treatment, water will first be conveyed through a gravity mainline to a Slow Sand Filter (to be constructed at the highest point of Lawbah village). Treated water will be collected in a Clear Water Reservoir and thereafter it will be supplied by gravitational flow to the entire village, which is 2.1 kms away from the *Umbampuit* through a series of distribution network.

8. RECOMMENDATIONS FOR LAWBAH WSS

- It is recommended that the WSS project be installed in Lawbah village.

CHAPTER 7. MAWKHAN-MAWDON WATER SUPPLY SCHEME

Mawkhan and Mawdon (25.216068°N and 91.563362 °E) are villages in the East Khasi Hills District of Meghalaya. They fall under the Mawsynram C& RD Block.

1. MAWKHAN AND MAWDON VILLAGES DEMOGRAPHY AND HOUSEHOLDS

As per the Census 2011 the following table shows the demographic description of Mawdon and Mawkhan villages.

Table 12 Demographic Details as per Census 2011

Name of Village	Total No. of HHs	Total Pop	Total Male Pop	Total Female Pop	Literate Pop.	Illiterate Pop.
Mawdon	48	294	134	160	234	60
Mawkhan	81	464	244	220	364	100

Mawdon has 75 HH while Mawkhan has 94 HH. Mawdon has 11 Women Headed Households and Mawkhan has a 9 Women Headed Households. Less than 20 HHs in Mawdon villages are landless families, and only 1 HH is landless in Mawkhan. Mawdon has a total population of 343 persons (179 Males and 185 Females) and Mawkhan has a population of 443 persons (243 Males and 200 Females).

As per the interaction the team had with the Village Executive Committees the following was recorded:

Table 13 Demographic Detail of Mawdon and Mawkhan Villages as of 2017

Village	No. of HHs	Total Pop.	Total Male Pop.	Total Female Pop.	No. of WHH	No. of Landless HHs
Mawdon	75	343	179	185	11	<20
Mawkhan	94	443	243	200	9	1

2. OCCUPATIONAL PROFILE OF MAWKHAN AND MAWDON VILLAGES

Residents of Mawdon and Mawkhan villages are mostly agriculturalist (99% of the population). Their main products are betle nut, bay leaf, pepper and piper which they sell to the market. The closest market to these villages is Hatmawdon. There are some HHs which are engaged in small poultry and piggery farms which they use for self-consumption. Every household earns below Rs. 20,000 per annum. The residents of the villages related that the agricultural production has dropped in the recent past as the soil quality has become degraded.

3. STATUS OF WATER RELATED HEALTH ISSUES IN MAWKHAN AND MAWDON VILLAGES

Skin problems and diarrhoea are the most prevalent water related diseases in the village.

4. EDUCATIONAL PROFILE OF MAWKHAN AND MAWDON VILLAGES

Table 14 Educational Profile of Mawdon and Mawkhan Village

S. No.	Level Of Education	Population in Mawdon who are educated till that level	Population in Mawkhan who are educated till that level
1.	Illiterate	41	66
2.	Primary Education	40	35
3.	Secondary Education	25	21
4.	Sr. Secondary Education	12	19
5.	Graduation	7	15
6.	Post-Graduation	1	-
7.	Vocational Training	-	2

5. BASIC FACILITES IN MAWDON VILLAGE

Table 15 Basic Facilities in Mawdon Village

Basic Facility		Presence		
		Yes	Nos.	No
Govt. Offices		-	-	✓
Community Centre		-	-	✓
Places Of Worship		✓	4	-
School	Primary	✓	1	-
	Secondary	-	-	✓
	H. Secondary	-	-	✓
	College	-	-	✓
Anganwadi Centre		✓	1	-
Police Station		-	-	✓
PDS		✓	-	-

Bank		-	-	✓
Medical	**Pharmacy**	-	-	✓
	Pvt Doctor	-	-	✓
	PHC	-	-	✓
	CHC	-	-	✓
	Local Healer	-	-	✓
Water Sources	**PHE Water**	✓	1	-
	Springs	✓	1	-
	Stream	✓	2	-
	River	✓	1	-

6. BASIC FACILITIES IN MAWKHAN VILLAGE

Table 16 Basic Facilities in Mawkhan Village

Basic Facility		**Presence**		
		Yes	**Nos.**	**No**
Govt. Offices		-	-	✓
Community Centre		✓	1	-
Places Of Worship		✓	2	-
School	**Primary**	✓	1	-
	Secondary	-	-	✓
	H. Secondary	-	-	✓
	College	-	-	✓
Anganwadi Centre		✓	1	-
Police Station		-	-	✓
PDS		-	-	✓
Bank		-	-	✓
Medical	**Pharmacy**	-	-	✓
	Pvt Doctor	-	-	✓
	PHC	-	-	✓
	CHC	-	-	✓

	Local Healer	-	-	✓
Water Sources	**PHE Water**	✓	-	-
	Springs	✓	3	-
	River	✓	2	-

7. MAWDON AND MAWKHAN VILLAGE RESOURCE MAPS

Table 17 Mawdon Village Resource Map

S. No.	Village Land Use	Yes/No	Nos	Area (acres)
1.	Reserve Forest	No	-	-
2.	Community Forest	Yes	1	
3.	Clan Forest	Yes	3	-
4.	Private Forest	Yes	100% HHs	-
5.	Sacred Grove	No	-	-
6.	Privately Owned Water Bodies	-	-	-
7.	Community Owned Water Bodies	-	-	-
8.	Fallow Land	-	-	-
9.	Cultivable Waste Land	-	-	-
10.	Land Under Miscellaneous Tree Crops	-	-	-

Table 18 Mawkhan Village Resource Map

S. No.	Village Land Use	Yes/No	Nos	Area (acres)
1.	Reserve Forest	No	-	-
2.	Community Forest	Yes	5	7.5 approx
3.	Clan Forest	Yes	1	-
4.	Private Forest	Yes	100% HHs	-
5.	Sacred Grove	No	-	-
6.	Privately Owned Water Bodies	-	-	-
7.	Community Owned Water Bodies	Yes	3 Springs	-
8.	Fallow Land	Yes	-	30 approx
9.	Cultivable Waste Land	-	-	-
10.	Land Under Miscellaneous Tree Crops	-	-	-

8. WATER SOURCES IN MAWKHAN AND MAWDON VILLAGES

The source of the existing PHE scheme for Mawdon Water Supply Scheme is *Um Seinong Mawmluh* which is a small stream. This water supply scheme has been in operation since 1983-84 and has well outlived its project cycle. In Mawkhan village there are about 14-15 water platforms however, there is less water from the PHE supply.

Table 19 Parameters of Mawkhan-Mawdon Villages

Sl. No.	Variable	
1.	Co-ordinates of Village	25.216069˚N
		91.563362˚E
2.	Elevation of Village	502m
3.	Co-ordinates of Proposed Water Source	25.217541° N
		91.579936° E
4.	Elevation of Water Source	744m

5.	Elevation Difference between Proposed Water Source to Village	272m
6.	Aerial Distance from Source to Village (kms)	1.8

Apart from this Mawdon village has 2 springs within its' boundary which is used by all households to supplement PHE water as the quantity of water is too less and 1 river which is about 3 kms from Mawkhan village. Mawkhan has two rivers Um Sympih and Um Seiniong and 3 streams Umthli, Umli and Kyrthain. This water is used for washing and irrigation. During the lean water months, the water is used for drinking. Mawkhan practices rain water harvesting and uses this water during the water stressed months.

The villages are water stressed from March to April. Apart from using rain water the households also collect water from the springs (2.5 kms away).

Figure 3 Proposed Water Source for Mawkhan-Mawdon WSS

9. PROPOSED WSS FOR MAWKHAN-MAWDON VILLAGES

The shared Water Supply Scheme is sourced from Phodskhen stream which is located at 225.217541 °N and 91.579936 °E and at an elevation of 744m. Mawkhan also has a temporary water source called *Umjri* which can be used as an alternative source for the PHE Water Supply Scheme. This proposed water supply scheme is designed to meet the requirement of the village for 15 years and would be completed within a period of 2 years.

10. RECOMMENDATIONS FOR MAWKHAN-MAWDON WSS

- It is recommended that the WSS be installed in the Mawkhan-Mawdon villages.
- However, as the two villages are adjacent to each other it is not viable to have two WSS projects and the research team is of the opinion that there be only one WSS to be shared by the two villages.

CHAPTER 8. MAWTEPIEW WATER SUPPLY SCHEME

Mawtepiew (25.215723° N and 91.587844° E) is a village in the East Khasi Hills District of Meghalaya. It falls in the Mawsynram C& RD Block and it is an elevation of 764 m.

1. MAWTEPIEW VILLAGE DEMOGRAPHY AND HOUSEHOLDS

As per the Census of India (2011) Mawtepiew has 125HH. It has a population of 686 persons out of which 341 are males and 345 are females. However, it was recorded during the interactions with village headman that as of 2017 there were 155HHs. There are 842 people residing in this village of which >389 are males and >453 are females. There are about 30 Women Headed Households (WHH) in the year 2017 and there are about 20 landless families in the village.

2. OCCUPATIONAL PROFILE OF MAWTEPIEW VILLAGE

Most of the residents in Mawtepiew village are agriculturalists who mostly grow bay leaf, broom-grass, arecanut, betle leaf, pepper and piper. There are few villagers who are salaried, few are involved in petty business and few are non-agricultural labourer. There are also some people who are engaged in animal husbandry (goat; poultry and piggery).

3. EDUCATIONAL PROFILE OF MAWTEPIEW VILLAGE

As per the Census of India (2011) about 73% of its population is literate

Table 20 Educational Profile of Mawtepiew Village

S. No.	Level Of Education	Population percentage as of 2017
1.	Illiterate	2-3%
2.	Primary And Secondary Education	6-7%
3.	Se. Secondary Education	4-5%
4.	Higher Education	1-2%

4. STATUS OF WATER RELATED HEALTH ISSUES IN MAWTEPIEW VILLAGE

Simple diarrhoea is the most prevalent water related disease in the village. Fever and other diseases like dysentery are some of the other prevalent disease in the village.

5. BASIC FACILITES IN MAWTEPIEW VILLAGE

Table 21 Basic Facilities in Mawtepiew Village

Basic Facility		Presence		
		Yes	Nos.	No
Govt. Offices		-	-	✓
Community Centre		✓	1	-
Places Of Worship		-	-	✓
School	**Primary**	✓	1	-
	Secondary	-	-	✓
	H. Secondary	-	-	✓
	College	-	-	✓
Anganwadi Centre		✓	1	-
Police Station		-	-	✓
PDS		✓		-

Bank		-	-	✓
Medical	**Pharmacy**	-	-	✓
	Pvt Doctor	-	-	✓
	PHC	-	-	✓
	CHC	-	-	✓
	Local Healer	-	-	✓
Water Sources	**PHE Water**	✓	1	-
	Springs	✓	2	-
	Stream	✓	2	-

6. MAWTEPIEW VILLAGE RESOURCE MAP

Table 22 Mawtepiew Village Resource Map

S. No.	Village Land Use	Yes/No	Nos.	Area (acres)
1.	Reserve Forest	No	-	-
2.	Community Forest	-	-	-
3.	Clan Forest	No	-	-
4.	Private Forest	Yes	>140 HHs	-
5.	Sacred Grove	No	-	-
6.	Privately Owned Water Bodies	No	-	-
7.	Community Owned Water Bodies	Yes	2	-
8.	Fallow Land	-	-	-
9.	Cultivable Waste Land	-	-	-
10.	Land Under Miscellaneous Tree Crops	-	-	-

7. WATER SOURCES IN MAWTEPIEW VILLAGE

Table 23 Parameters of Mawtepiew Village

Sl. No.	Variable	
1.	Co-ordinates of Village	25.215723˚N
		91.587844˚E
2.	Elevation of Village	764m
3.	Co-ordinates of Proposed Water Source	25.247003° N
		91.556491° E
4.	Elevation of Water Source	957m
5.	Elevation Difference between Proposed Water Source to Village	193m
6.	Aerial Distance from Source to Village (kms)	4.8

Mawtepiew's existing water supply is sourced from a nearby village called Lawbah. This spring originates from the community forest of Lawbah village. This spring also supplies water to two other villages: Lawbah village and Umtyllun village.

In Mawtepiew village there are a total of 4 PHE water platforms out of which only 3 platforms are working. In this village all the PHE water tanks are in a dilapidated condition. Every 50 households in this village have to collect water from one platform. The PHE water provides water for only half an hour in a day. Therefore some households collect water only one bucket a day.

The village also has two springs; Umthangsyiar and Mih-um-spring located at a distance of less than 500 metres from the homesteads which are common properties. There are also about 10 HHs in the village that have their own dug-up well at their own residents. The villagers use the water from these sources for drinking, washing and other domestic purpose.

The village is water stressed for the past 13 years especially during the winter months from November to March. During these months, the households collect water from two springs that become extremely important for all types of domestic consumption in the village.

8. PROPOSED WSS AT MAWTEPIEW VILLAGE

The new water supply scheme for this village also originates from the community forest of Lawbah village (25.247003° N and 91.556491° E). This new water source is at an elevation of 957m and is about 4.8 km away from Mawtepiew village.

9. RECOMMENDATIONS FOR MAWTEPIEW VILLAGE

- It is recommended that the WSS scheme for Mawtepiew Village be installed as early as possible as this is one of the most water stressed villages.
- As the source of the proposed water scheme is nearly 5 kms away from the village, it is recommended that more than one TP be built certain distances apart.

CHAPTER 9. LAITSOHUM WATER SUPPLY SCHEME

Laitsohum (25.277648° N and 91.564268° E) is a village in the East Khasi Hills District of Meghalaya. It falls in the Mawsynram C& RD Block and can be found at an elevation of 1367 m.

1. LAITSOHUM VILLAGE DEMOGRAPHY AND HOUSEHOLDS

As per the interaction the team had with the Village Executive Committee in 2017 there are 52 HHs. There are 253 people residing in this village of which 121 are males and 105 are females. There are about 16 Women Headed Households (WHH) in the year 2017.

2. OCCUPATIONAL PROFILE OF LAITSOHUM VILLAGE

Laitsohum is an agricultural village which mostly plants bay leaf and broom grass. There are also some villagers involve in animal husbandry (poultry and piggery).

3. EDUCATIONAL PROFILE OF LAITSOHUM VILLAGE

About 90% of its population is literate.

4. STATUS OF WATER RELATED HEALTH ISSUES IN LAITSOHUM VILLAGE

Simple diarrhoea is the most prevalent water related disease in the village. Fever and dysentery are the other prevalent diseases in the village.

5. BASIC FACILITES IN LAITSOHUM VILLAGE

Table 24 Basic Facilities in Laitsohum Village

Basic Facility		Presence		
		Yes	Nos.	No
Govt. Offices		-	-	✓
Community Centre		✓	1	-
Places Of Worship		✓	3	-
School	Primary	✓	2	-
	Secondary	-	-	✓
	H. Secondary	-	-	✓
	College	-	-	✓
Anganwadi Centre		✓	1	-
Police Station		-	-	✓
PDS		✓	1	-
Bank		-	-	✓
Medical	Pharmacy	-	-	✓
	Pvt Doctor	-	-	✓
	PHC	-	-	✓
	CHC	-	-	✓
	Local Healer	✓	1	-
Water Sources	PHE Water	-	-	✓
	Springs	✓	2	-
	Stream	✓	3	-

6. LAITSOHUM VILLAGE RESOURCE MAP

Table 25 Laitsohum Village Resource Map

S. No.	Village Land Use	Yes/No	Nos.	Area (acres)
1.	Reserve Forest	Yes	5	98.842 approx.
2.	Community Forest	Yes	1	988.422 approx.
3.	Clan Forest	No	-	-
4.	Private Forest	No	-	-
5.	Sacred Grove	Yes	4	40 approx.
6.	Privately Owned Water Bodies	No	-	-
7.	Community Owned Water Bodies	Yes	3	-
8.	Fallow Land	Yes	1	250 approx.
9.	Cultivable Waste Land	Yes	8	2 approx.
10.	Marshy Land That Can Be Used For Aquaculture	Yes	6	1 approx.

7. WATER SOURCES IN LAITSOHUM VILLAGE

Laitsohum has no PHE water supply as yet. Laitsohum village has two springs; Mawbynna and Wahtongum. The villagers use the water from these springs for drinking, washing and other domestic purpose. They get sufficient water during monsoon. During the water stressed period from December to April each household gets 2-4 buckets of water per day which they have to go and collect from the springs. The distance from the village to the spring is 120 – 150 metres.

Table 26 Parameters of Laitsohum Village

Sl. No.	Variable	
1.	Co-ordinates of Village	25.277648˚N
		91.564268˚E
2.	Elevation of Village	1367m
3.	Co-ordinates of Proposed Water Source	25.261251° N
		91.550238° E
4.	Elevation of Water Source	1109m
5.	Elevation Difference between Proposed Water Source to Village	(-) 258m
6.	Aerial Distance from Source to Village (kms)	2.3

The proposed source is from a streamlet located at a lower elevation of 1109 metres originated from the community forest of Laitsohum village. The distance of the project source to the village is about 2 kilometres.

As the water source is a spring, during the water surplus, water is pumped to a plastic water tank near the village and is then collected by households from this water tank.

Figure 4 Proposed Water Source for Laitsohum WSS

8. PROPOSED WSS AT LAITSOHUM VILLAGE

The new scheme which is proposed to supply water to Laitsohum village is called the Laitumsaw Water Supply Scheme. The proposed source is from a streamlet located at a lower elevation of 1109 metres originated from the community forest of Laitsohum village. The distance of the project source to the village is about 2 kilometres. As the elevation of the water source is lower than that of the village it has been proposed that motor pumps shall be used to convey water to the village through water pipes.

9. RECOMMENDATIONS FOR LAITSOHUM WSS

- It is recommended that the WSS be installed in Laitsohum Village which is water stressed.
- As the water source for Laitsohum WSS is at a lower elevation than the village, it is recommended that the motor pump to be used is sustainable, i.e. electric power pumps are not viable as there may be electric power shortages.
- Capacity/training for one village member to maintain this motor pump.

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