# MINISTRY OF HEALTH AND SPORTS
## Department of Public Health

## WORLD WATER DAY

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Occupational and Environmental Health Division

# SUSTAINABLE DEVELOPMENT GOAL (SDG)

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# Goal 6: Ensure availability and sustainable management of water and sanitation for all

**Target 6.1:** *By 2030, achieve universal and equitable access to safe and affordable* ***drinking water for ALL***

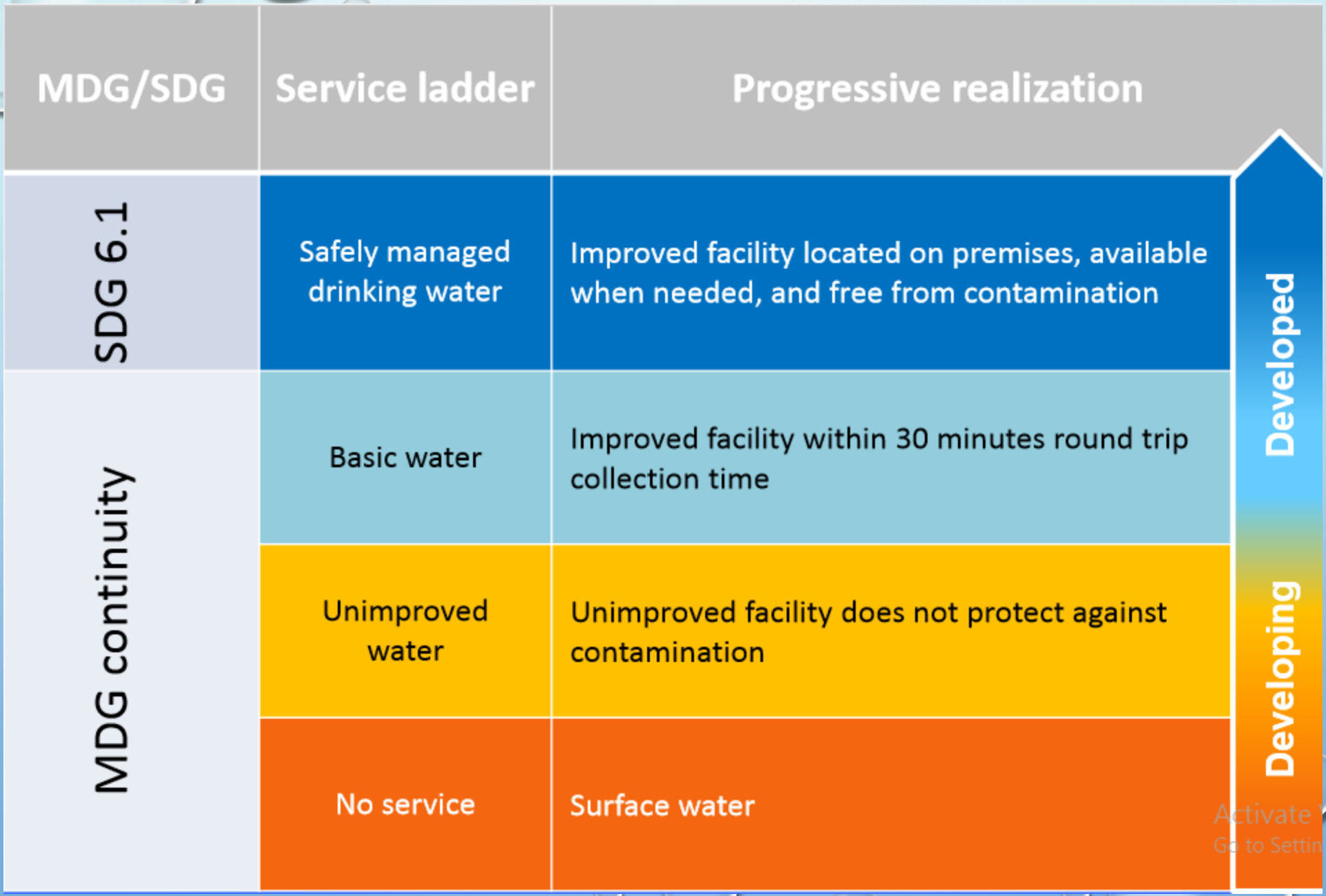
**Target 6.2:** *By 2030, achieve access to adequate and equitable* ***sanitation and hygiene for ALL****, and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations*

# SDG Indicator for Drinking Water

6.1.1: Percentage of population using safely managed drinking water services

Definition: Population using an improved drinking water source (MDG definition) which is:

- located on premises, Accessibility
- available when needed, and Availability
- free of faecal and priority chemical contamination Quality


MDG/SDG
Service ladder
Progressive realization
SDG 6.1
Safely managed drinking water
Improved facility located on premises, available when needed, and free from contamination
MDG continuity
Basic water
Improved facility within 30 minutes round trip collection time
Unimproved water
Unimproved facility does not protect against contamination
No service
Surface water
Developed
Developing

# SDG Indicator for Sanitation and Hygiene

6.2.1: Percentage of population using safely managed sanitation services, including a handwashing facility with soap and water

Definition: Population using an improved sanitation facility (MDG definition) which is:

- not shared with other households and where — Accessibility
- excreta are safely disposed in situ or transported and treated off-site — Quality

Plus a handwashing facility with soap and water

| MDG/SDG | Service ladder | Progressive realization |
| --- | --- | --- |
| SDG 6.2 | Safely managed sanitation | Private improved facility where faecal wastes are safely disposed on site or transported and treated off-site; plus a handwashing facility with soap and water |
| MDG continuity | Basic sanitation | Private improved facility which separates excreta from human contact |
| | Shared sanitation | Improved facility shared with other households |
| | Unimproved sanitation | Unimproved facility does not protect against contamination |
| | No service | Open defecation |

Developed

Developing

# RISK ASSESSMENT

# RISK ASSESSMENT

1. Arsenic mitigation project (Bago and Ayeyarwaddy region)
2. Fluoride mitigation project in Wetlet
3. Assessment of lead poisoning in Myeik
4. Water safety plan and water quality surveillance
5. Assessment of the mercury contaminated environmental media

# ARSENIC MITIGATION PROJECT (2000–2012)

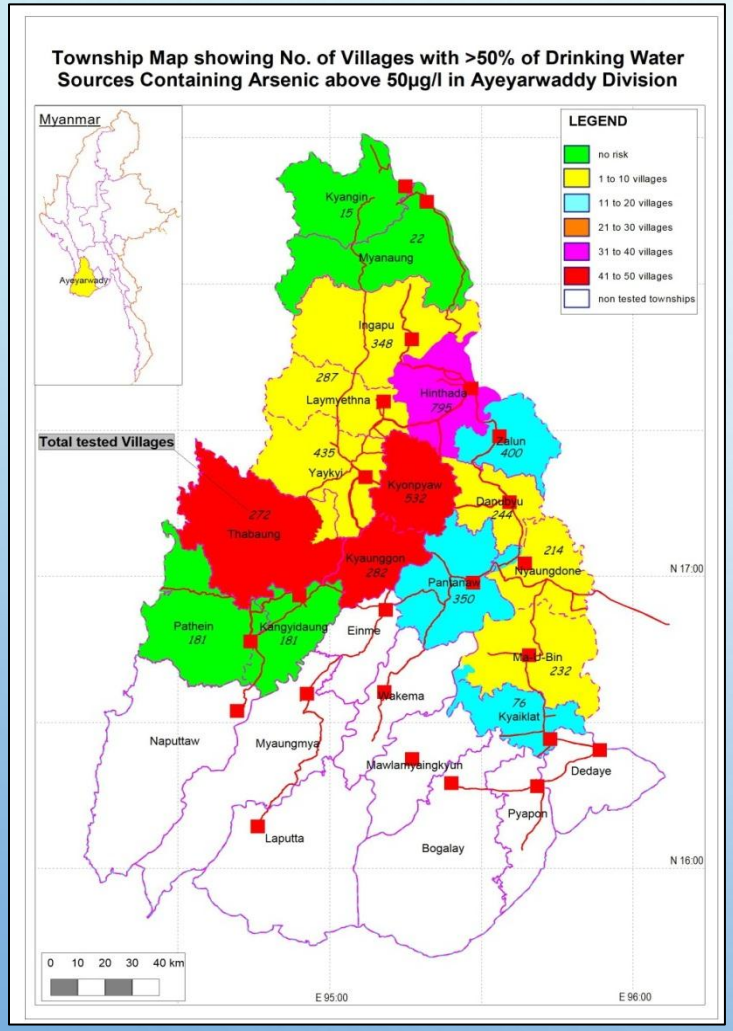
- Arsenic mitigation project

  Testing of > 200,000 water sources in 61 townships
- Digital Arsenator for field testing
- AAS for laboratory test (Confirmation)
- Monitor seasonal variation in selected townships

Process of Arsenic detection, mapping, public awareness and mitigation

# ARSENIC MITIGATION PROJECT IN AYEYARWADDY REGION

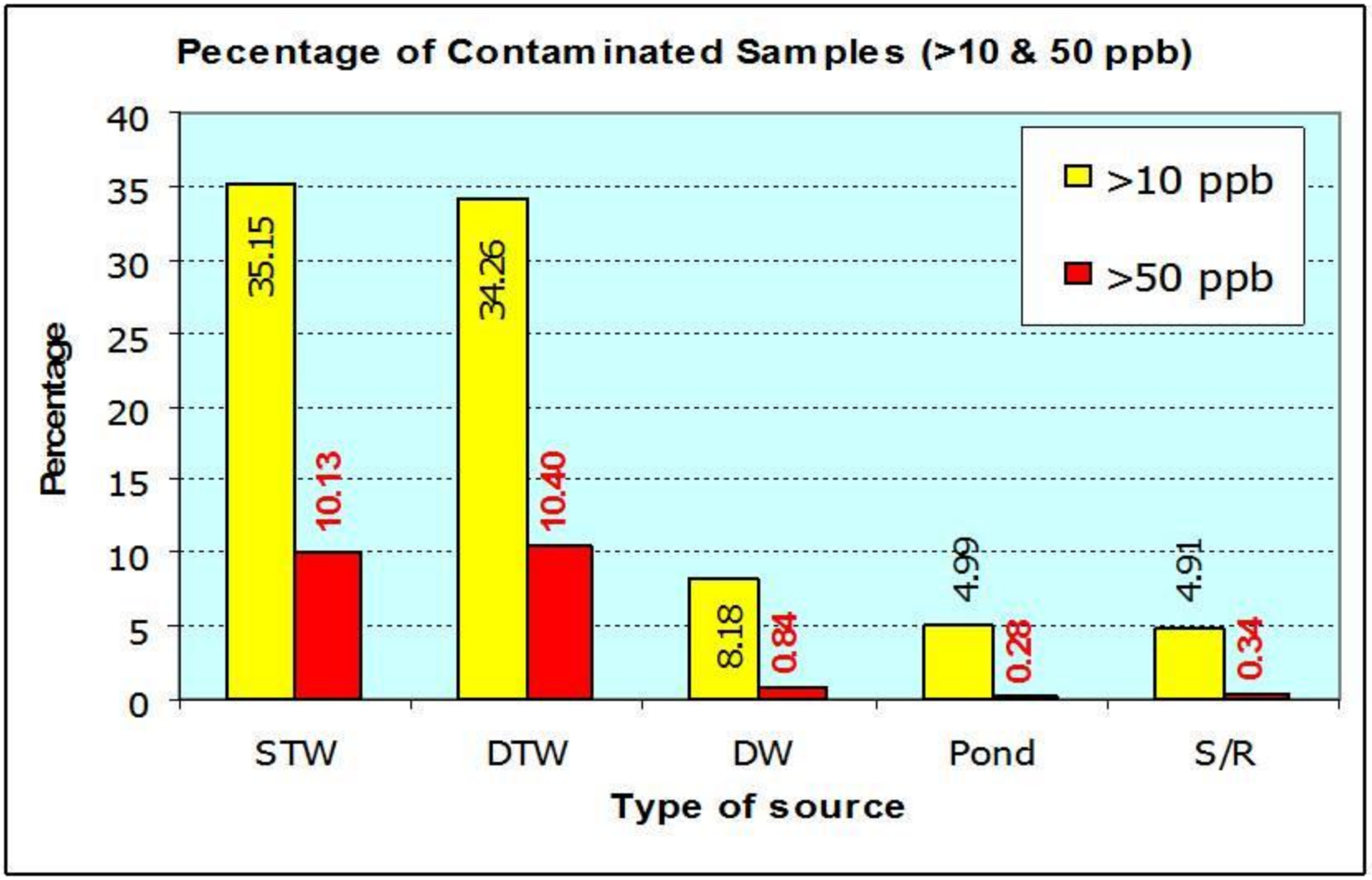
# SITUATION OF ARSENIC CONTAMINATION IN DRINKING WATER SOURCES




| Sr. | Source | No of Source | % |
|---|---|---|---|
| 1. | Deep tube well (DTW) | 17,720 | 16.12 |
| 2. | Shallow tube well (STW | 69,614 | 59.42 |
| 3. | Dug well (DW) | 26,157 | 22.27 |
| 4. | Pond | 1,422 | 1.39 |
| 5. | River/Stream (R/S) | 875 | 0.80 |
| | Total | 115,788 | 100 |

- Tested 17 tsps of middle and northern part of Region and ponds are main sources for domestic water supply ( Selected WS in Kyankhin, Myanaung , Pathein and Kyaiklatt tsps)
- In tested area, about 75% of sources are tubewell and about 22% are dug well
- Approximately 97% of domestic water are groundwater
- 29.18 % > 10 ppb and 8.19% >50 ppb
- **Arsenic > 50µg/l - DTW: 2,085 (10.87 %), STW 7,826 (10.36 %) STW, and DW 244 (0.91 %)**

# Situation of Arsenic Contamination in drinking water sources

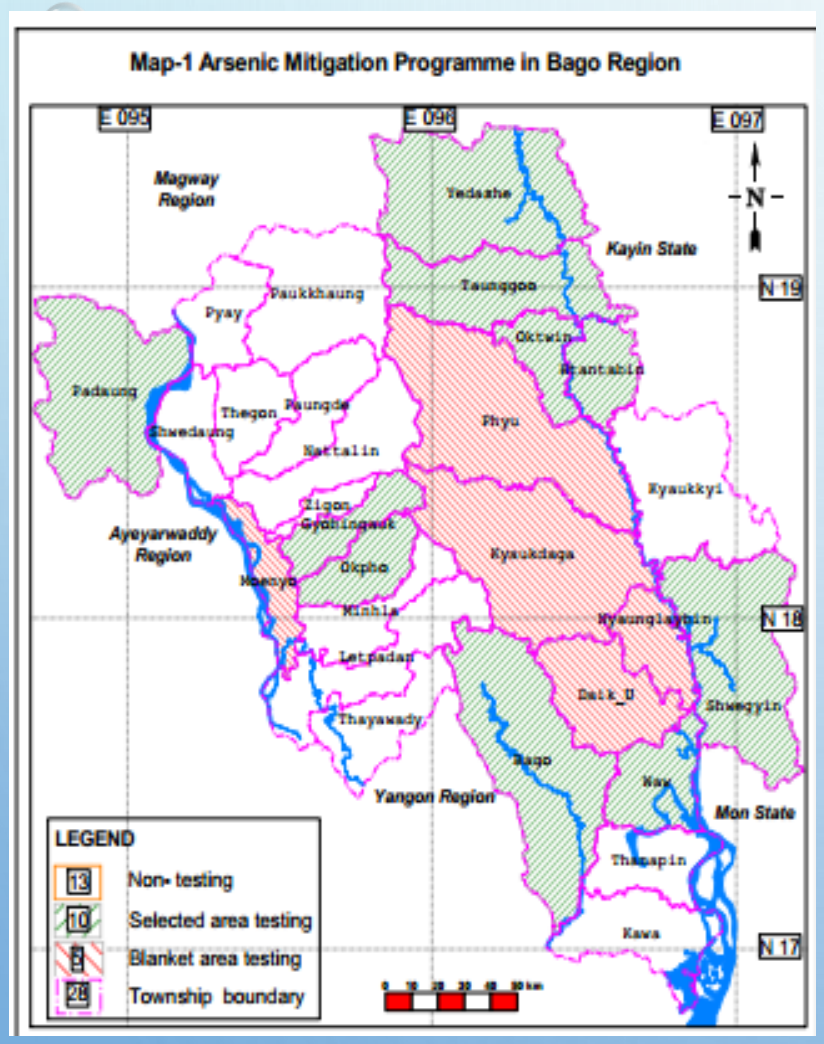


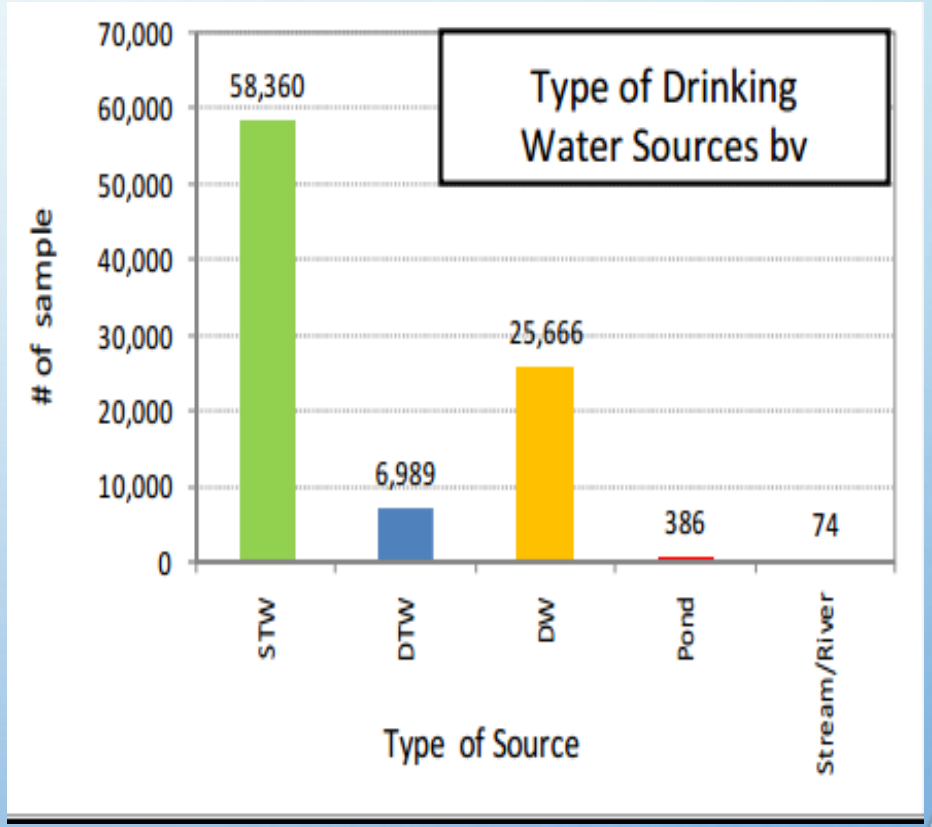
# Who does what

- Arsenic testing (**OH, DoH**)
- Arsenicosis survey (**DMR, Lower Myanmar**)
- Community-based arsenic mitigation (**CHEB**)
- Providing alternate safe water options (**ESD, DDA/DRD**)
- Data entry, GIS Mapping and Analysis (**WRUD**)
- Hydro-geological studies (**WRUD, Contractors**)

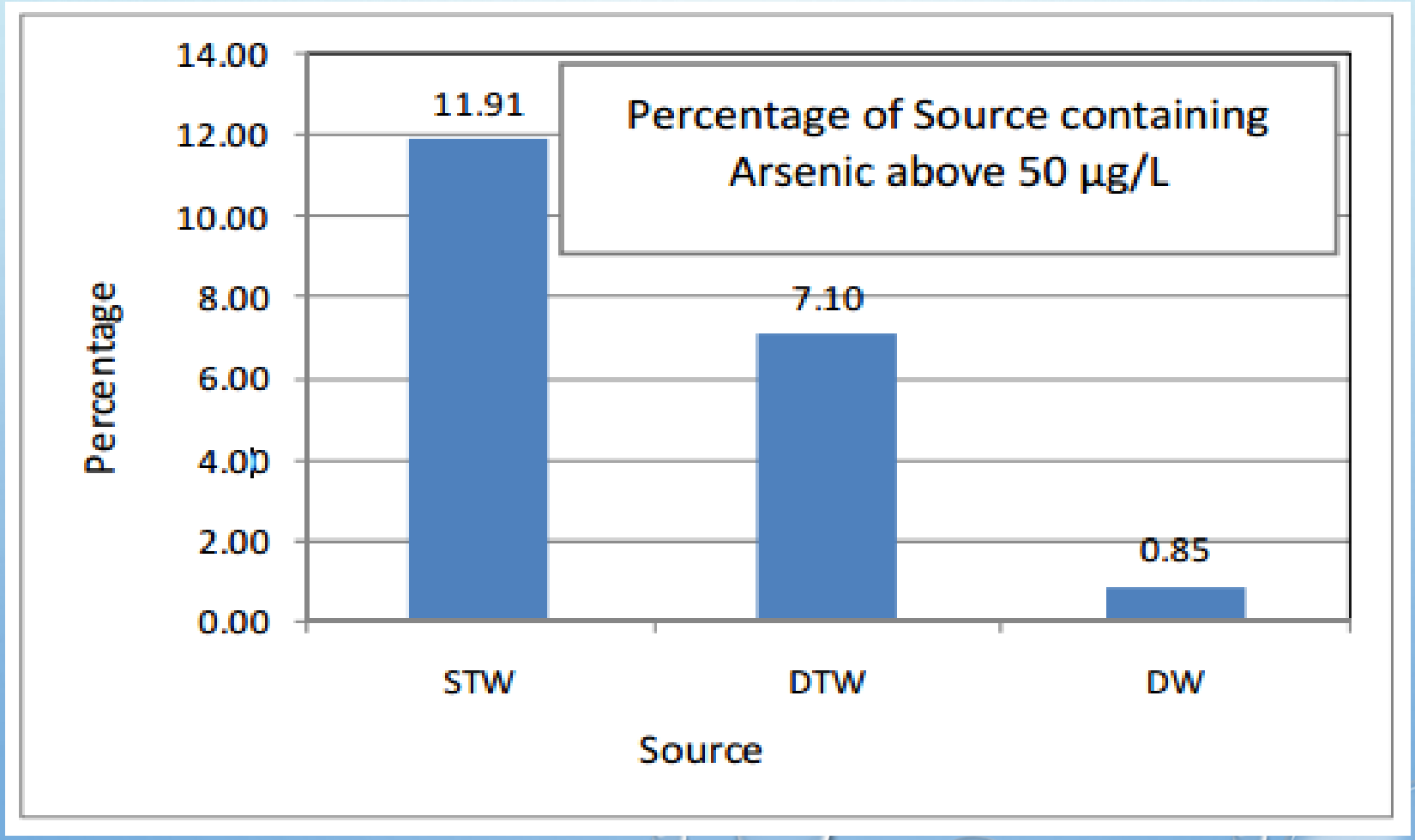
# ARSENIC MITIGATION PROJECT IN BAGO REGION

# Tested drinking water sources in Bago region



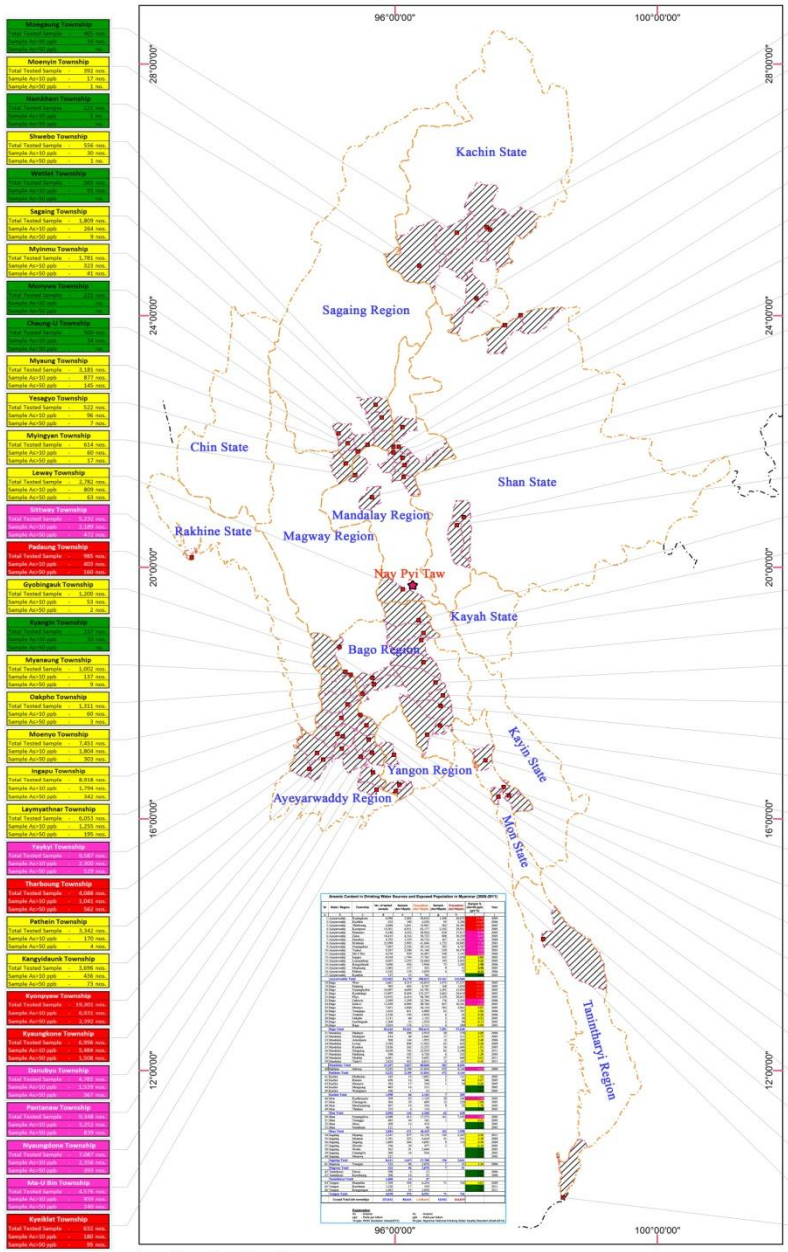
# Percentage of source containing Arsenic above 50 µg/l



# Arsenic contamination of varying degree by type of water sources

| Type of Sources | Total Sources | Arsenic Detected (µg/l) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0 ppb | | 1-10 ppb | | 11-50 ppb | | 51-100 ppb | | >100 ppb | |
| | | Source | % | Source | % | Source | % | Source | % | Source | % |
| STW | 8,605 | 1,838 | 21.36 | 966 | 11.23 | 5,049 | 58.68 | 685 | 7.96 | 67 | 0.77 |
| DTW | 785 | 159 | 20.25 | 84 | 10.70 | 520 | 66.24 | 21 | 2.68 | 1 | 0.13 |
| DW | 4,134 | 2,745 | 66.40 | 746 | 18.05 | 590 | 14.27 | 42 | 1.02 | 11 | 0.26 |
| Pond | 39 | 31 | 79.49 | 7 | 17.95 | 1 | 2.56 | - | - | - | - |
| SW | 26 | 17 | 65.39 | 7 | 26.92 | 2 | 7.69 | - | - | - | - |
| Total | 13,589 | 4,790 | 35.25 | 1,810 | 13.32 | 6,162 | 45.35 | 748 | 5.50 | 79 | 0.58 |

# Arsenic Contamination in Drinking Water Sources of Myanmar (2005-2011)



# SURVEY ON ACTIVE CASE DETECTION OF ARSENICOSIS IN AYEYARWADY DIVISION

| PERIOD | TSP | VILL | H/H | POP | REMARKS |
|---|---|---|---|---|---|
| (2002 Feb to Mar) | Kyonpyaw | 10 | 276 | 955 | 2 probable cases |
| | Thabaung | 15 | 272 | 1119 | |
| (2004 Mar to April) | Hinthada | 40 | 659 | 2296 | 1 probable case |
| | Zalun | 15 | 306 | 660 | |
| | Kyonpyaw | 24 | 1019 | 4020 | 3 probable cases |
| (2005 Dec to 2006 Feb) | Hinthada | 5 | 212 | 805 | |
| | Zalun | 5 | 123 | 535 | |
| | Kyonpyaw | 5 | 163 | 730 | |
| | Pantanaw | 13 | 431 | 2060 | |
| TOTAL | 5 | 132 | 3461 | 13180 | |

# SURVEY ON ACTIVE CASES DETECTION OF ARSENICOSIS IN BAGO DIVISION

| Division | Townships | Villages | H/H | POP | Remarks |
|---|---|---|---|---|---|
| Feb 2004 | Waw | 4 | 445 | 1960 | One probable case |
| | Kyauktaga | 11 | 508 | 2778 | |
| | Deik-Oo | 5 | 358 | 1742 | |
| Feb 2006 | Nyaunglaybin | 2 | 165 | 909 | |
| | Phyu | 2 | 249 | 974 | |
| TOTAL | 5 | 24 | 1725 | 8363 | |

# SURVEY ON ACTIVE CASES DETECTION OF ARSENICOSIS IN AYEYARWADY & BAGO DIVISIONS (2002-2006)

| Division | Tsps | Villages | H/H | POP | Remarks |
|---|---|---|---|---|---|
| Ayeyarwady | 5 | 132 | 3461 | 13180 | 6 cases of arsenicosis |
| Bago | 5 | 24 | 1725 | 8363 | One case |
| TOTAL | 10 | 156 | 5186 | 21543 | |

# MULTIPLE SPOTTED AREAS OF MELANOSIS

on the back

over the chest

Case (1) 68 yrs, F,
Nail Sample - 1950 µg/Kg ,
(Normal – 430 to 1080 µg/Kg)

# WHITISH MACULES IN HYPERPIGMENTED AREA

on the back

over the chest

Case (2) 63 yrs, F

Nail Sample- 1894 µg/Kg

(Normal – 430 to 1080 µg/Kg)

Patchy skin hyperpigmentation

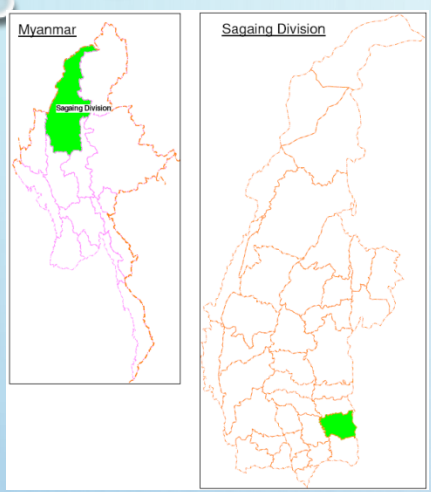
Arsenical hyperkeratosis

Skin cancer

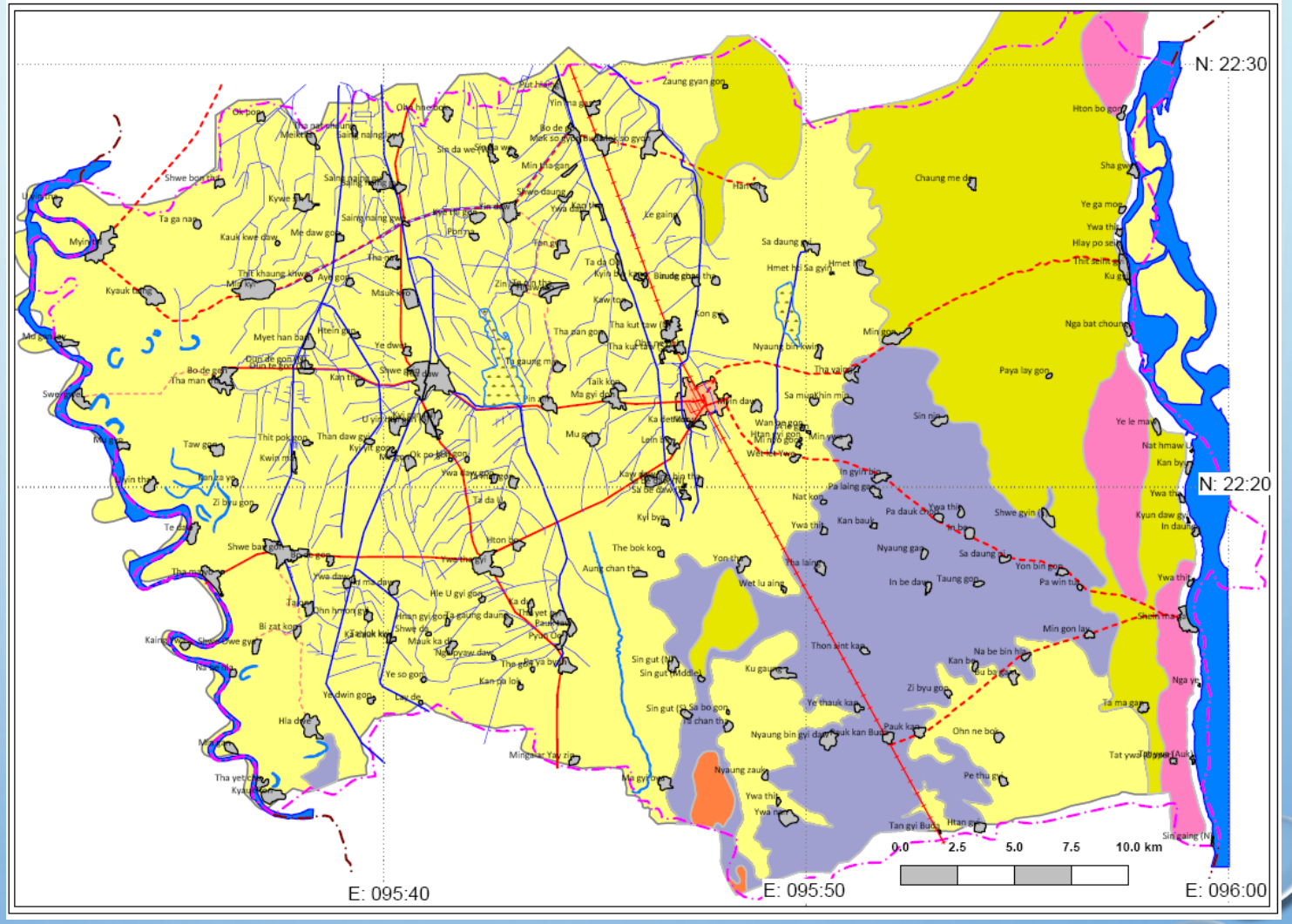
# FLUORIDE TESTING AND CASE MANAGEMENT (2012-14)

- Test fluoride content in >1,000 samples
- Trained 81 BHS from Wetlet township

# LOCATION MAP




- The native place of Ashin Janakabhivamsa
- Made up of 3 wards, 69 village tracts (228 villages)



# Distribution of tested drinking water sources according to fluoride contents

| No | Name of Village | 0.00-0.50 mg/l | 0.51-1.00 mg/l | 1.01-1.50 mg/l | 1.51-2.00 mg/l | 2.01-2.50 mg/l | 2.51-3.00 mg/l | Total |
|---|---|---|---|---|---|---|---|---|
| | Total | 106 | 252 | 362 | 356 | 28 | 10 | 1114 |
| | | 720 | | | 394 | | | |

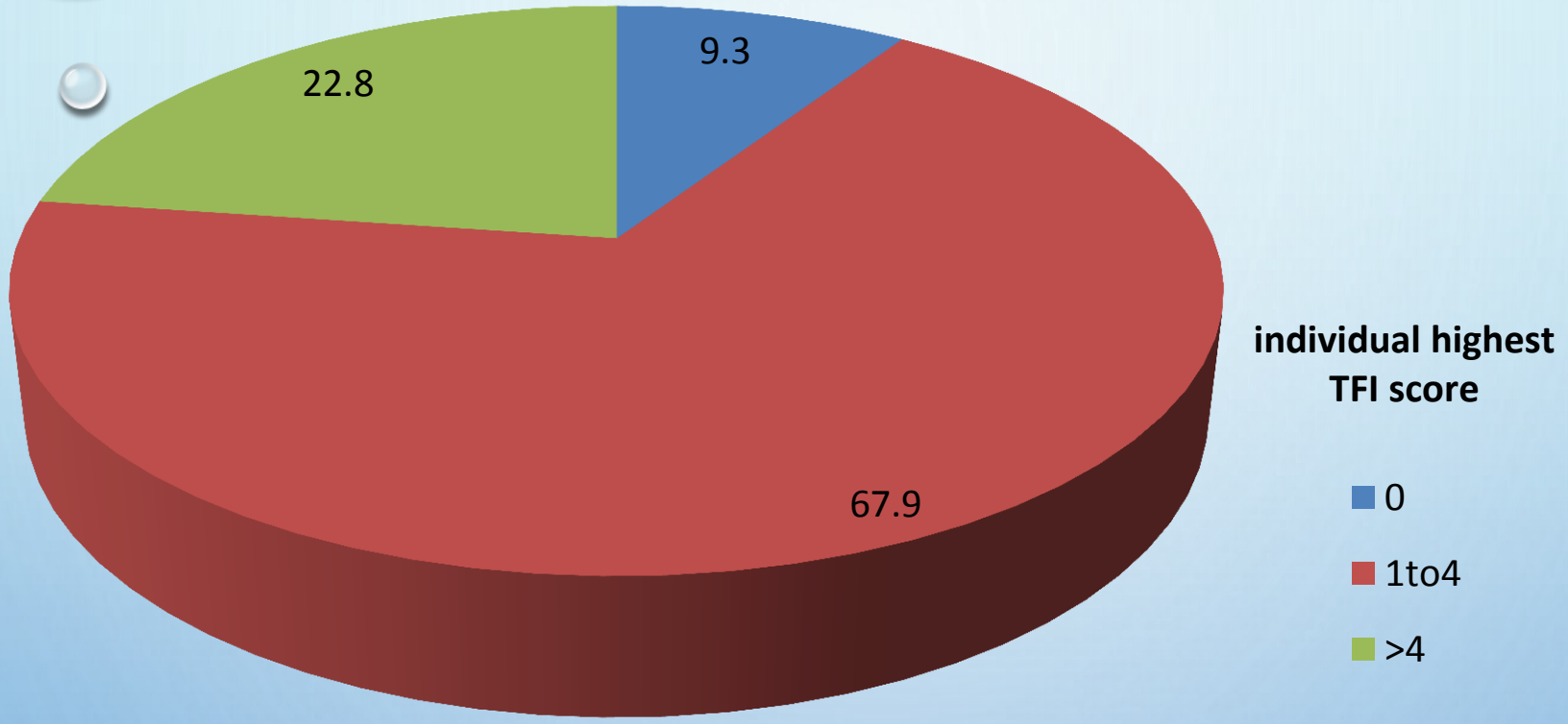
| No | Type of water source | ≤ 1.5 mg/l | > 1.5 mg/l |
|---|---|---|---|
| 1 | Dug well | 141 (43.79%) | 181 (56.21%) |
| 2 | Shallow tube well | 530 (74.96%) | 177 (25.04%) |
| 3 | Deep tube well | 13 (27.08%) | 35 (72.92%) |
| 4 | Pond/Lake | 36 (97.30%) | 1 (2.70%) |
| Total | | 720 (64.64%) | 394 (35.36%) |

**Prevalence and severity of dental fluorosis conditions among sampled students, measured according to the highest TFI score in their dentations, (N=702)**

| Variable | Category | n | % |
|---|---|---|---|
| Prevalence of dental fluorosis | without fluorosis(TFI=0) | 65 | 9.3 |
| | with fluorosis | 637 | 90.7 |

# Severity of dental fluorosis conditions among sampled students, measured according to the highest TFI score in their dentations, (N=702)

| Severity of dental Fluorosis | n | % |
|---|---|---|
| 0 | 65 | 9.3 |
| 1 | 64 | 9.2 |
| 2 | 82 | 11.7 |
| 3 | 243 | 34.6 |
| 4 | 88 | 12.5 |
| 5 | 52 | 7.4 |
| 6 | 31 | 4.4 |
| 7 | 38 | 5.4 |
| 8 | 31 | 4.4 |
| 9 | 8 | 1.1 |




**Severity of dental fluorosis among sampled students, measured according to individual TFI highest score. Data for fluorosis level was categorized as TFI score0, 0 to 4 and >4**

# MITIGATION PLAN

- Comprehensive health education and health promotion in the Wet let community and advocacy to the local and regional authority
- Management of dental fluorosis to reduce the psycho-social impacts of children and motivate to use of fluoride free water for drinking and cooking purpose
- Alternative water sources in high risk areas

# LEAD (2012)

- **Assessment of lead toxicity in Myeik township**
  - Total water sources for lead analysis→617
  - All water samples are within normal limit  of drinking water quality standard of Myanmar (<10ppb)
  - Urine ALA and urinary coproporphyrin testing in under five children- 802
  - Blood lead testing - 323
  - Increased blood lead level- 28
- **Assessment of lead toxicity in Baw Sai, Kalaw Township**
  - Total water sources for lead analysis - 10
  - Urine ALA and urinary coproporphyrin testing - 87
  - Blood lead testing - 38 - All normal

# CONDITIONS OF URINE LEAD INTOXICATION

| Total children from 5 wards | No. of children with increase urinary ALA | No. of children with increase urinary Coproporphyrin | No. of children with increase both tests |
|---|---|---|---|
| 802 | 214 | 5 | 94 |

## BLOOD LEAD LEVEL

| Total children from 5 wards | No. of children increase with Blood lead level (>10 µg/dl) |
|---|---|
| 323 | 28 |

# WATER SAFETY PLAN

# COMMUNITY BASED WATER SAFETY PLAN

- **Pauk township**

  28-29 may, 2014: advocacy & TOT, “TMO office”

  June,2014: WSP trainings at (41) places, community level (287 teams made up of 1,331 participants)

  Budget: 4.1 million MMK

- **Wetlet township**

  24-25 july, 2014: advocacy & TOT at “Myint hall”

  August,2014: WSP trainings at (49) places, community level (440 teams made up of 1,320 participants)

  Budget: 5.1 million MMK

- **Myaing township**
- 26-27 august, advocacy & TOT at “2 villages”
- **Three staffs with support of HQ & FO**

# STEP-01 (PLANNING)

- Discuss with TMO & DRD officials, set date for TOT on WSP, collect information on existing WASH
- Inform local authorities
    1. Township administrative committee (TAC)
    2. Township development committee (TDC)
    3. Township development supportive committee (TDSC)
- Share information to representative of regional Pyithu Hluttaw

# STEP-02 (OPENING )

- Opening speech

  Representative of regional Pyithu Hluttaw, Chairperson of TAC and HOS ( HQ / TMO)

- Invited guest

  District level DRD officials, chairperson of 3 committees, PO, TEO

- 75 participants ( BHS , YRD, MRCS and selected WUC)
- Request TAC for necessary guidance to VT administrators


# STEP-02 CONTINUED (INFO )

- Township-wise approach
- Two to three separate workshops depend on No. of BHSs and villages
- Request the number & type of WS of covered villages
- Prepare enough forms and manuals for WSP
- Conduct at suitable workshop place

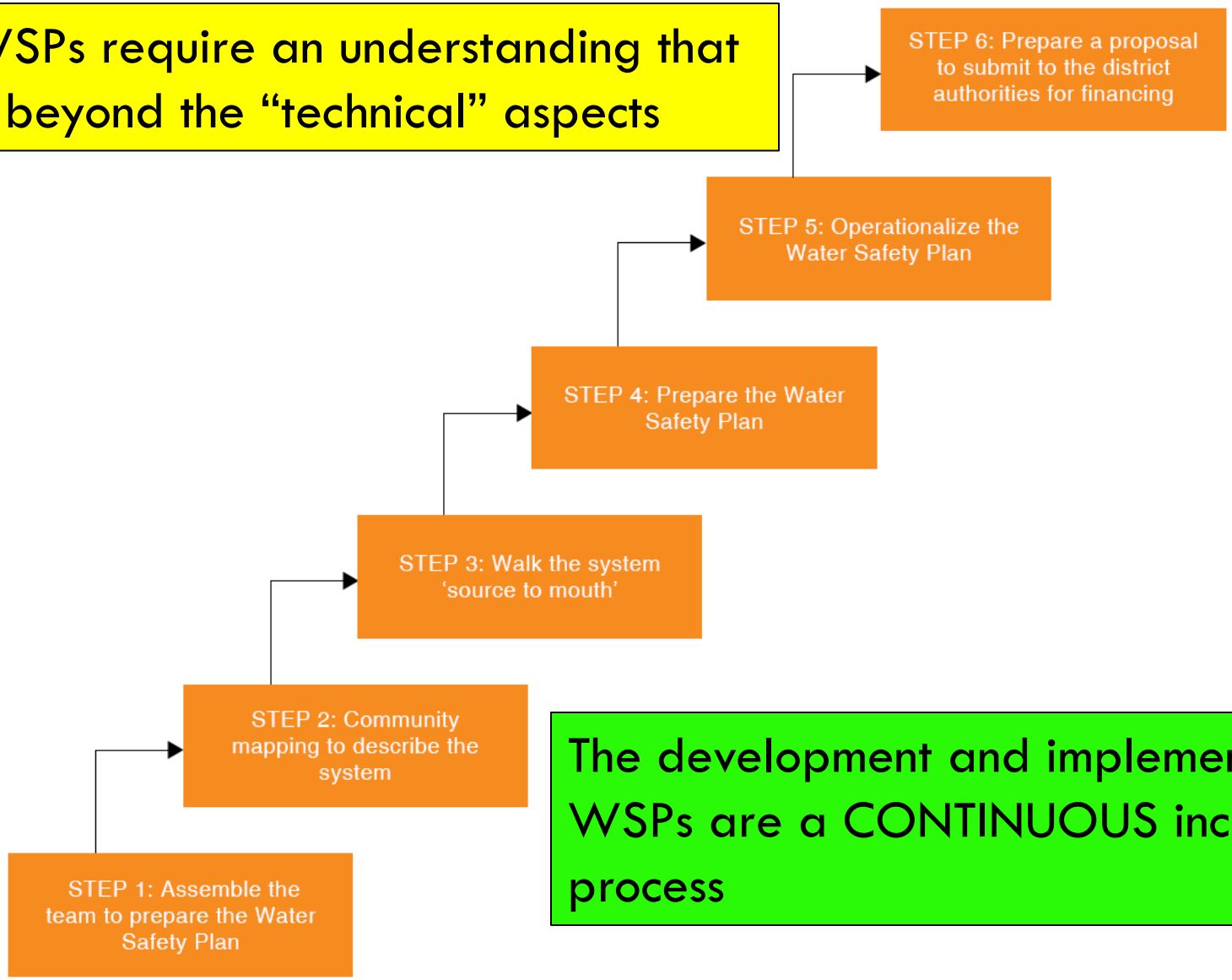
# STEP-03 ( TOT ON WSP)

- Definition of safe water
- Causes of contamination
- Definition of WSP
- WASH situation in Myanmar
- Step by step implementation

  (Step 1 to 6)

# STEP-04 ( 6 STEPS ON WSP )

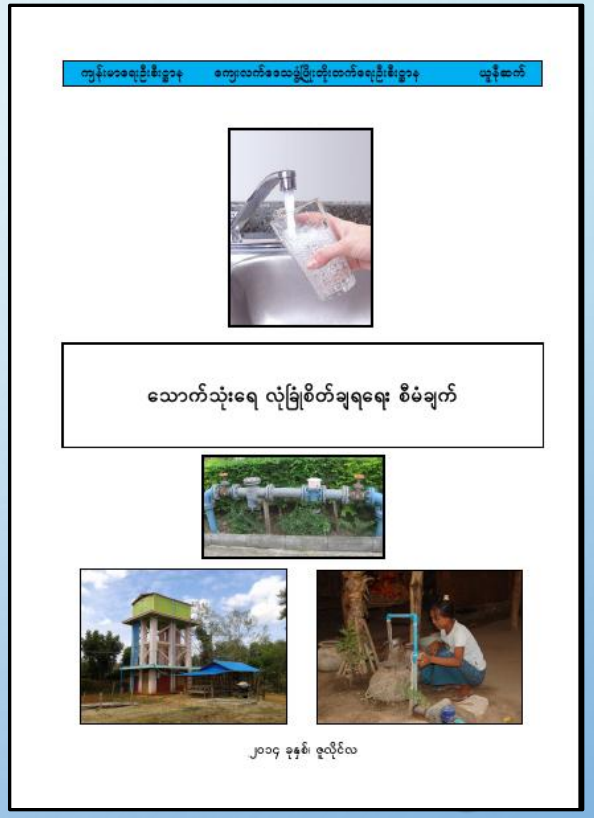
WSPs require an understanding that is beyond the "technical" aspects




The development and implementation of WSPs are a CONTINUOUS incremental process

# STEP-05 ( DECISION)

- Form teams depending No. of water sources & HH
- Discuss & set “DATE” for community level training
- Provide required FORM & manual for community level training
- Report to TAC by TMO
- Give guidance to VT administrators on WSP, support training on WSP



# Community training plan of Wetlet

-4th to 28th August, 2014

-Support training by UNICEF

| SC | # of villages | Trainer | Team | Members | Date |
|---|---|---|---|---|---|
| **MCH** | | | | | |
| Unit 1 | 9 | 3 | 11 | 33 | 11/14.8.14 |
| Unit 2 | 11 | 3 | 10 | 30 | 12.8.14 |
| **Shein Ma Kar SH** | | | | | |
| Shein Ma Kar | 5 | 3 | 11 | 33 | 4.8.14 |
| Tat Ywar | 5 | 3 | 7 | 21 | 4.814 |
| Shwe Kyin | 3 | 3 | 5 | 15 | 5.8.14 |
| Ohn Hne Boat | 6 | 3 | 11 | 33 | 6.8.14 |
| Yay Lel Maw | 7 | 3 | 9 | 27 | 7.8.14 |
| **Pauk Kan RHC** | | | | | |
| Pauk Kan | 5 | 3 | 5 | 15 | 13.8.14 |
| Nyaung Zauk (Ywar Nan) | 4 | 3 | 6 | 18 | 5.8.14 |
| Nyaung Pin Kyine Taw | | 3 | 5 | 15 | 6.8.14 |
| Sing Kount (N) | 5 | 3 | 4 | 12 | 15.8.14 |
| Sing Kount (S) | | 3 | 2 | 6 | 16.8.14 |
| Yone Thar | 2 | 3 | 2 | 6 | 17.8.14 |
| Kyue Kaing | | 3 | 5 | 15 | 18.8.14 |
| Aung Chan Thar | 9 | 3 | 10 | 30 | 10.8.14 |
| **Moke Soe Chon RHC** | | | | | |
| Moke Soe Chon | 3 | 3 | 12 | 36 | 27.8.14 |
| Hpwut Line | **3** | **3** | **6** | **18** | 20.8.14 |
| Han Lin | 4 | 3 | 16 | 48 | 18.8.14 |
| Kyay Tee Kone | 5 | 3 | 12 | 36 | 15.8.14 |
| Hnaw Pin | 6 | 3 | 12 | 36 | 17.8.14 |
| Mauk Kyoe | 5 | 3 | 10 | 30 | 12.8.14 |
| **Min Chi RHC** | | | | | |
| Min Chi | 3 | 3 | 12 | 36 | 17.8.14 |
| Kyaut Taing | 2 | 3 | 10 | 30 | 9.8.14 |
| Myin Thi | **5** | **3** | **9** | **27** | 10.8.14 |
| Don Te Kone | 6 | 3 | 8 | 24 | 14.8.14 |
| Saing Naing Gyi | 3 | 3 | 11 | 33 | 10.9.14 |
| Kywe Zin | 5 | 3 | 10 | 30 | 12.8.14 |
| **Ywar Thar Gyi RHC** | | | | | |
| Ywar Thar Gyi | 8 | 3 | 14 | 42 | 12.8.14 |
| Ta Kaung Daunt | 11 | 3 | 13 | 39 | 14.8.14 |
| Tha Yet Gyi | 6 | 3 | 8 | 24 | 19.8.14 |
| Hpa Yar Pyan | **8** | **3** | **11** | **33** | 21.8.14 |
| Hla Taw | 4 | 3 | 15 | 45 | 26.8.14 |
| Mu Gyi | 4 | 3 | 11 | 33 | 28.8.14 |
| **Shwe Pan Kone RHC** | | | | | |
| Shwe Pan Kone | 4 | 3 | 17 | 51 | 9.8.14 |
| Hla Tway | 6 | 3 | 11 | 33 | 10.8.14 |
| She Owe Ya | 6 | 3 | 9 | 27 | 8.8.14 |
| Mei Kone | **4** | **3** | **7** | 21 | 17.8.14 |
| Tha Man Tar | **6** | 3 | 14 | **42** | 16.8.14 |
| Swae Kway | 4 | 3 | 9 | 27 | 23.8.14 |

| **Yone Pin Kone RHC** | | | | | |
|---|---|---|---|---|---|
| Yone Pin Kone | **4** | **3** | **4** | 12 | 4.8.14 |
| Inn Be Gyi | 4 | 3 | 4 | 12 | 7.8.14 |
| Inn Gyin Pin | 8 | 3 | 7 | 21 | 8.8.14 |
| Sin Hnin | 5 | 3 | 9 | 27 | 11.8.14 |
| Thar Hlaing | **6** | 3 | 7 | **21** | 12.8.14 |
| **Thit Saint RHC** | | | | | |
| Thit Saint | 5 | 3 | 6 | 18 | 7.8.14 |
| Shar Kwae | **5** | **3** | **8** | 24 | 8.8.14 |
| Min Kone | 4 | 3 | 7 | 21 | 9.8.14 |
| Kyee Pin Kan | 7 | 3 | 8 | 24 | 10.8.14 |
| Tha Kut Thar | 6 | 3 | 10 | 30 | 11.8.14 |
| | 246 | 147 | 440 | 1320 | |

# STEP-06 ( ROLE OF BHSS)

STEP 1: Assemble the team to prepare the Water Safety Plan

**Before**

- Organize & form WSP teams jointly with village leader
- Conduct community level WSP trainings on set date
- Facilitate and motivate WSP teams
- Practical training on SI and others
- Assist and monitor WSP implementation

**After**

- Combine information prepared by WSP teams
- Prepare township-level info

# STEP-07 ( IMPLEMENTATION)

STEP 2: Community mapping to describe the system

STEP 3: Walk the system 'source to mouth'

- List existing drinking water sources in village
- Plan for source inspection
- Facilitate and motivate WSP teams by BHSs
- Assist and monitor WSP implementation

# CAMP BASED WATER SAFETY PLAN

# CAMP-BASED

- Conducted training on Water Quality Testing & WSP in Jan, 2013 at Sittwe & in Jan, 2015 at Myitkyina
- Participants of 47 Government officials ( DRD & DOH), NGOs attended
- Trained for testing microbiological contamination, measuring of residual chlorine, E.C and pH and chlorination


# DEVELOPMENT OF WATER QUALITY SURVEILLANCE SYSTEM MODEL IN MON STATE

(1) Mawlamyaing township -water sample (36)

(2) Mudone township - water sample (37)

(3) Tan Phyu Zayat township - water sample (43)

(4) Yae township - water sample (40)

(5) Kyeik Ma Yaw township - water sample (42)

(6) Paung township - water sample (33)

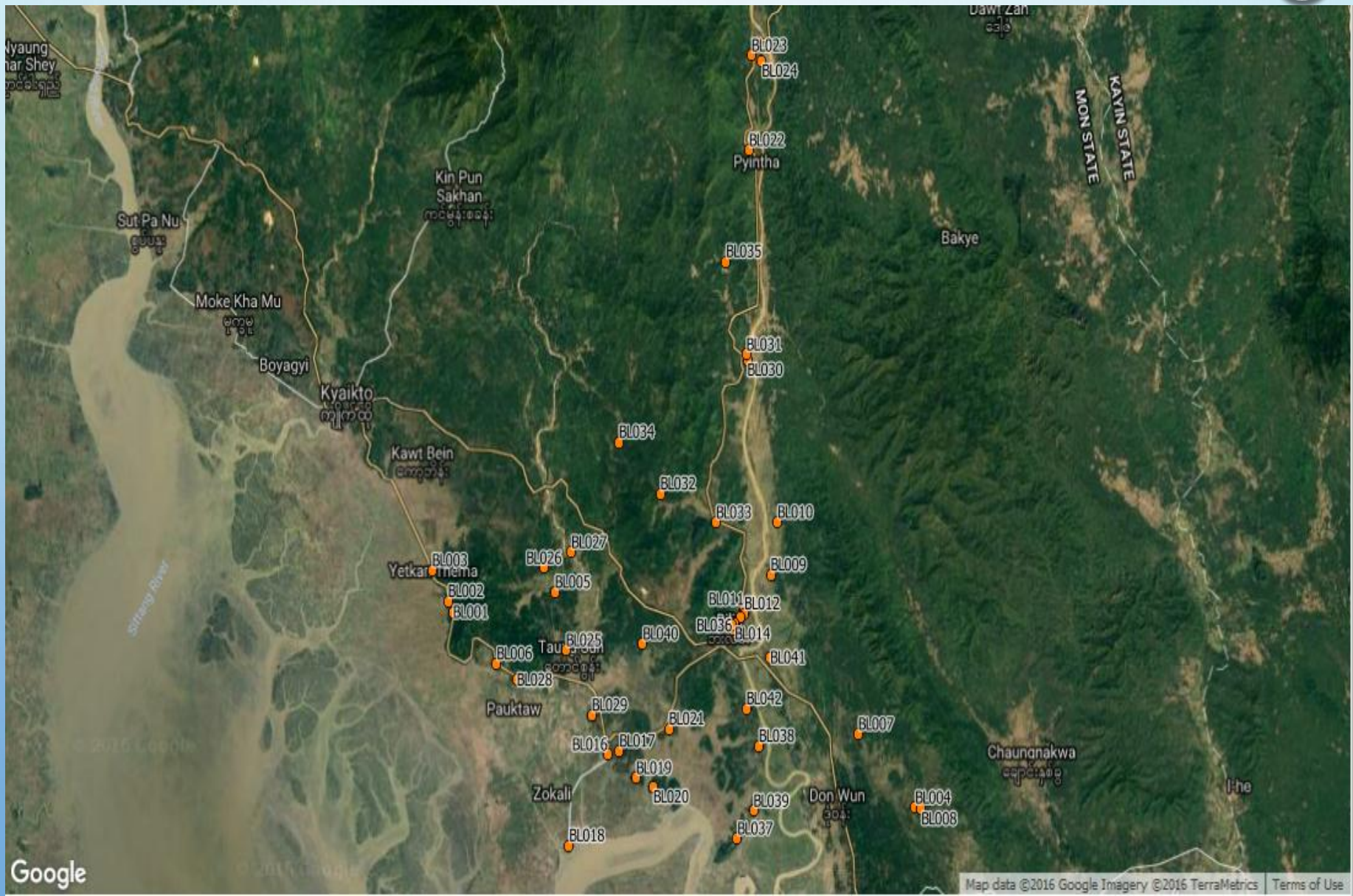
(7) Ta Htone township - water sample (41)

(8) Belin township - water sample (42)

(9) Kyeik Htho township- water sample (44)

- (9) townships- total water sample (358)
- Test (16) priority parameter from national drinking water quality standards (ph, total dissolved solid (TDS), turbidity , nitrate, chlorine, iron, manganese, hardness, sulphate, arsenic and coliform

# Drinking water sources in Belin township

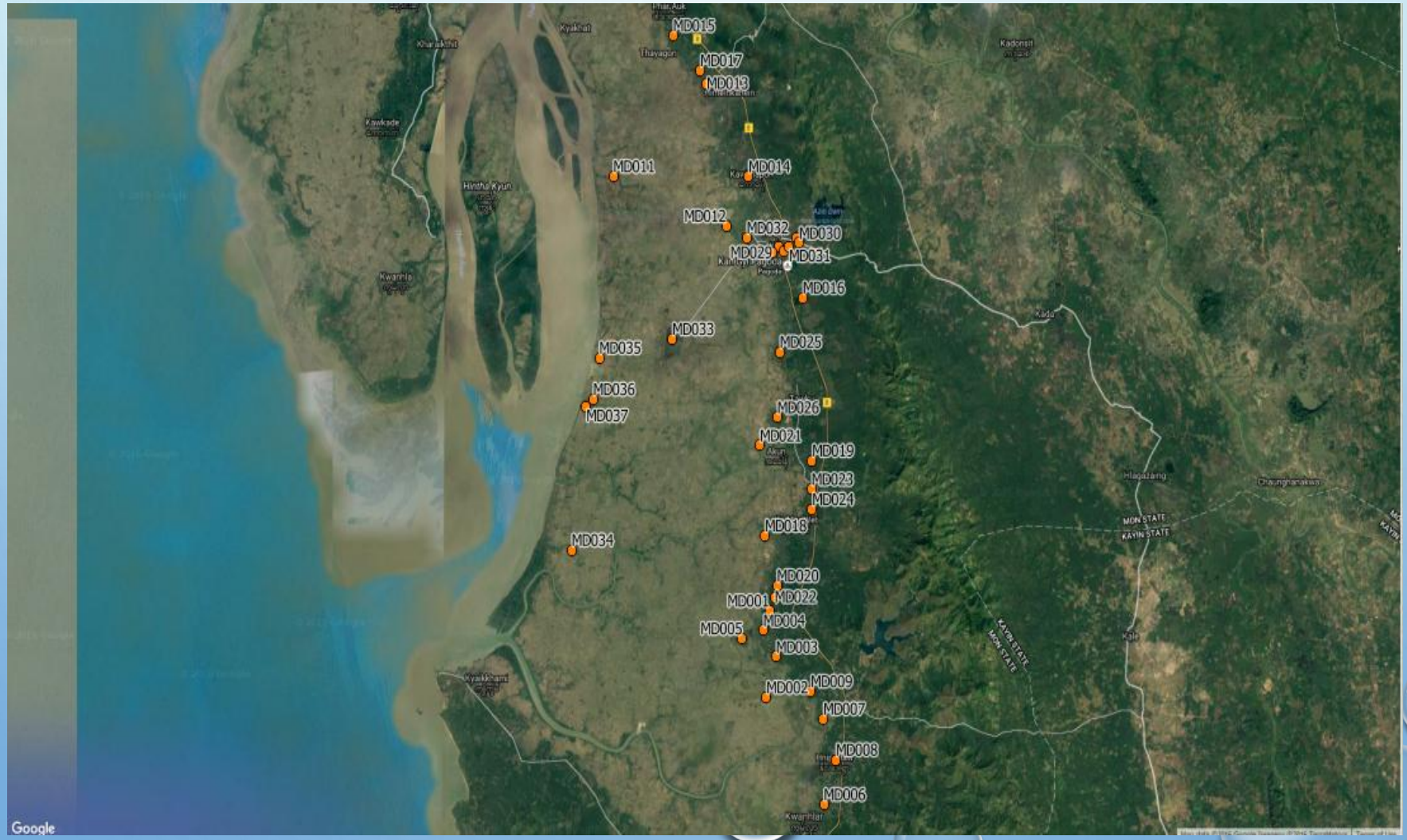


# Drinking water sources in Kyeik Htho township

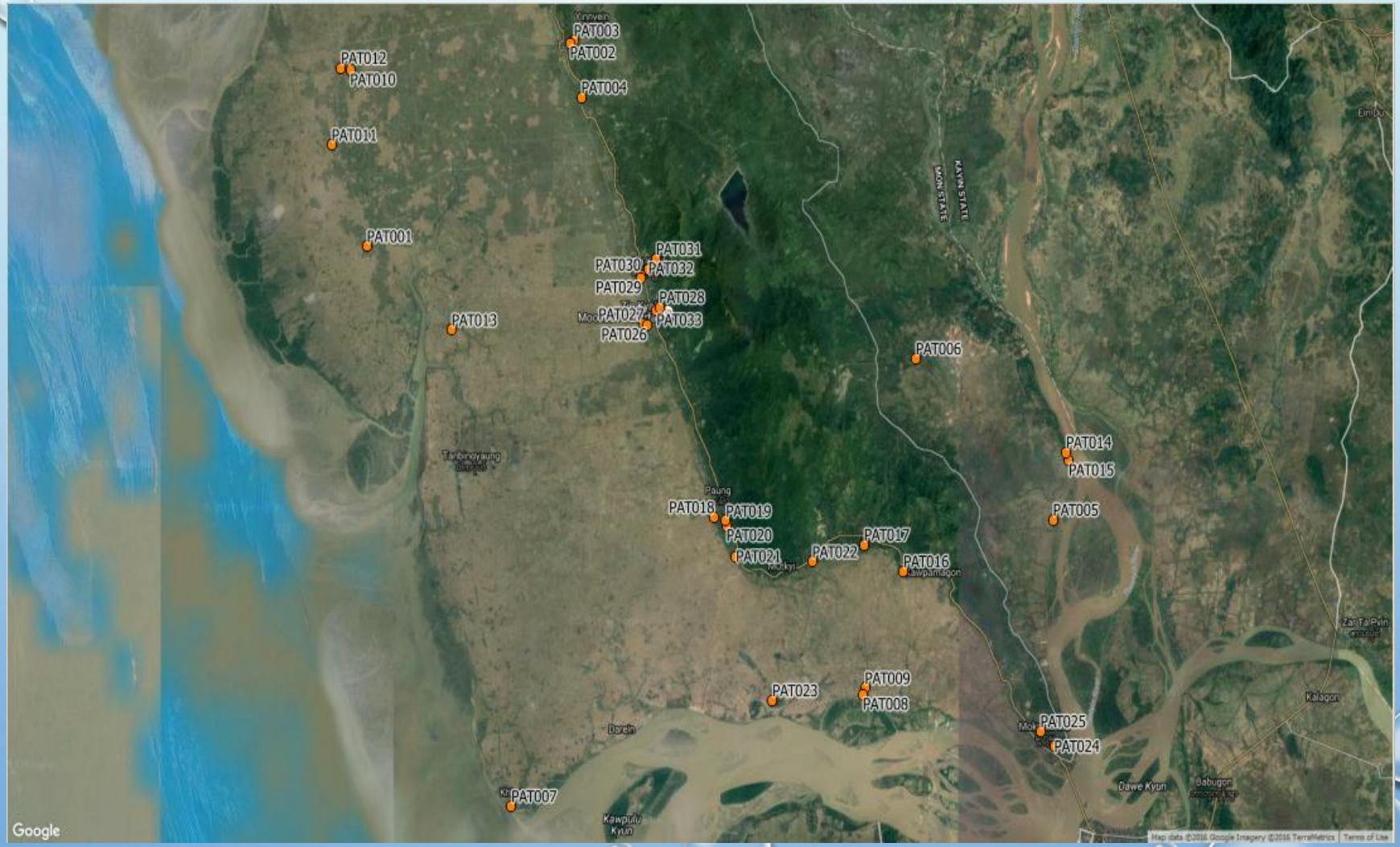
# Drinking water sources in Kyeik Ma Yaw township

# Drinking water sources in Mawlamyaing township

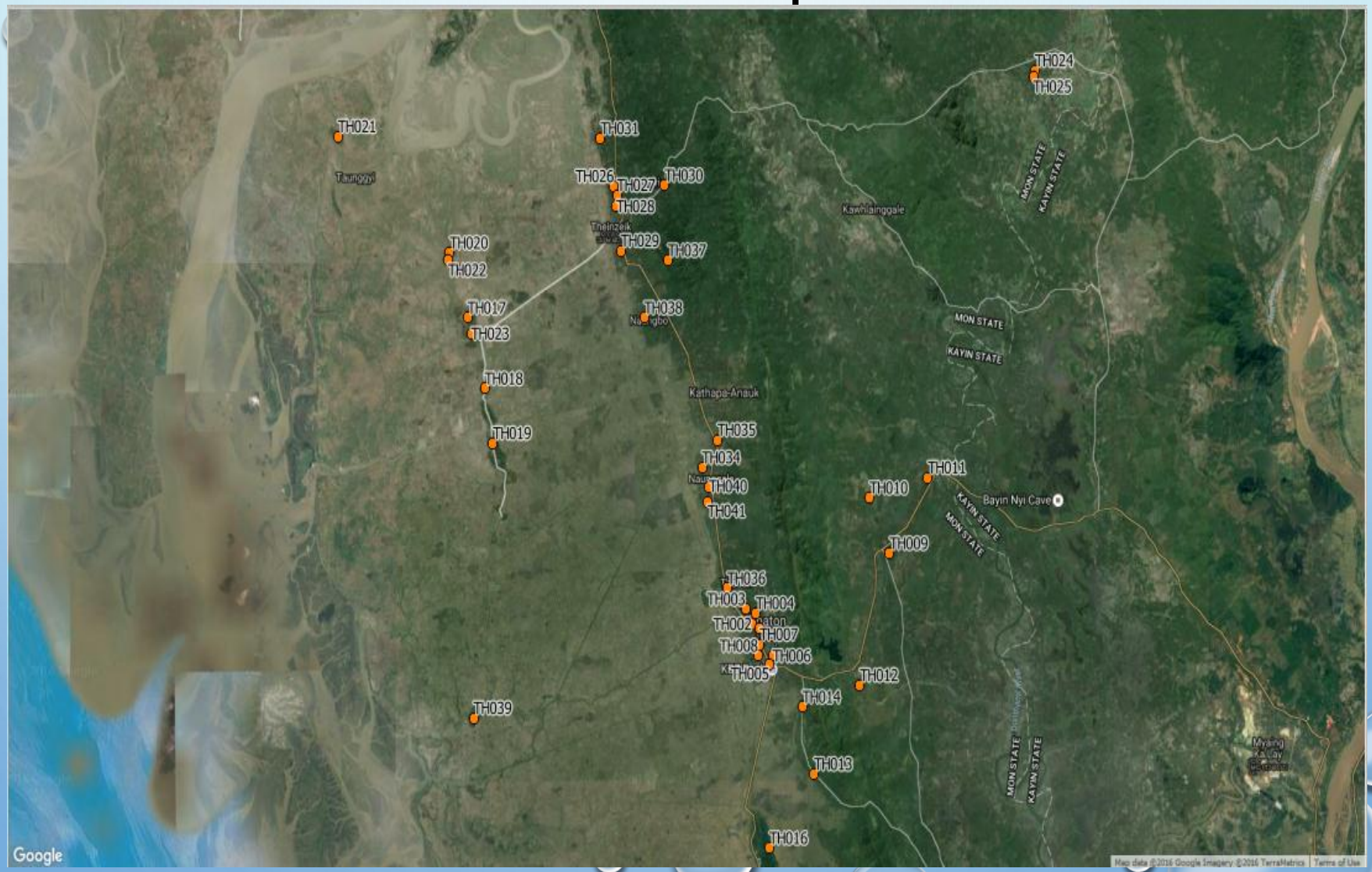
# Drinking water sources in Mu Done township



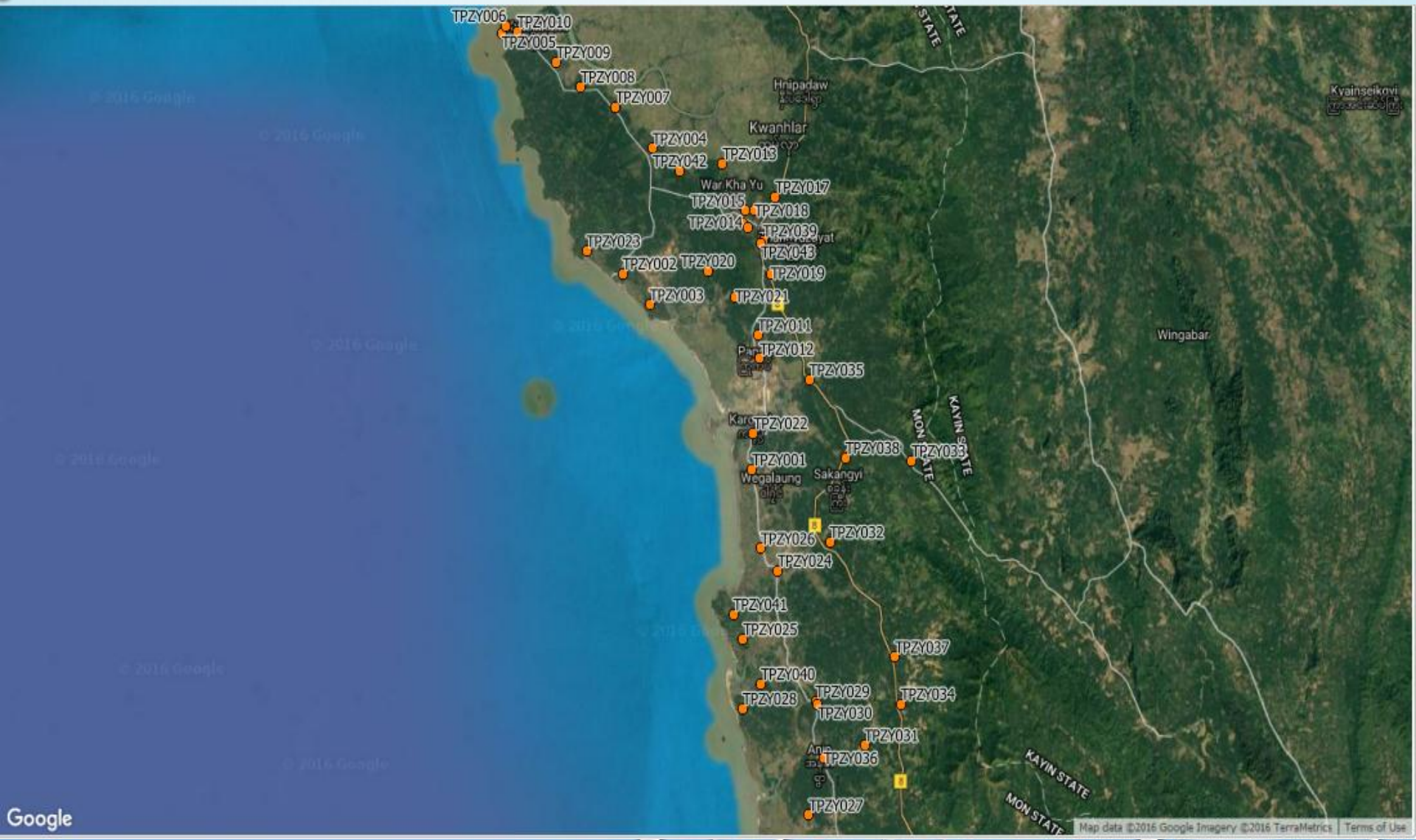
# Drinking water sources in Paung township



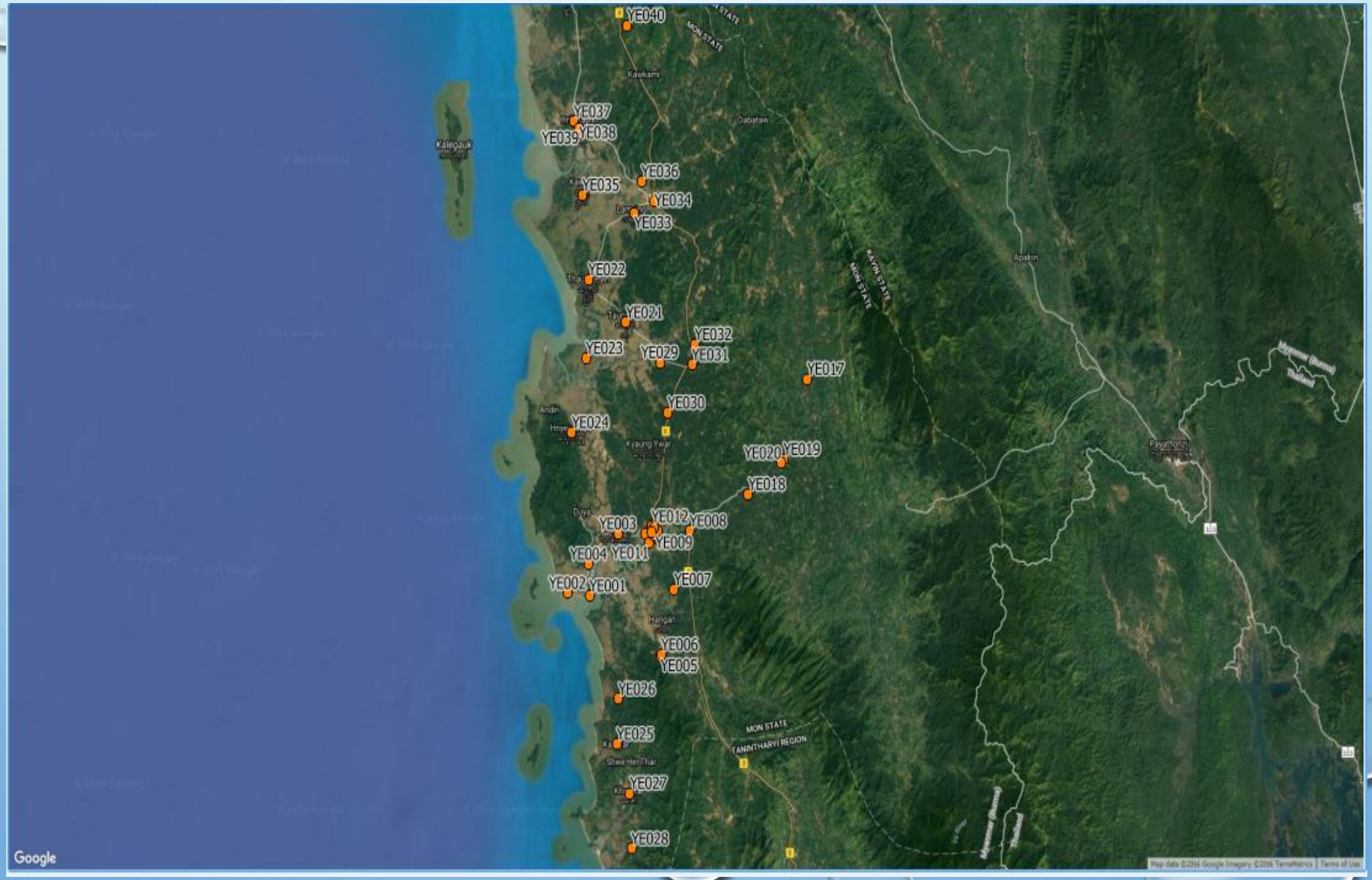
# Drinking water sources in Ta Htone township



# Drinking water sources in Thein Pyu Zayat township



# Drinking water sources in Yae township



# Drinking water quality testing in Mon State


# MERCURY

- Testing of mercury in  water sources near gold mines and gold refinery services
- Gold refinery services
  - Kawlinn township, Sagaing region
- Gold mines
  - Ta Beik Kyin township, Mandalay region
  - Ya Mae Thin township, Mandalay region

# Mercury Poisoning

Exposure : High toxicity: **mercurialism**

Acrodynia **('Pink Disease')**

-Pain

-Pink discolouration

**Minamata Disease**

-Ataxia

-Impairment of speech & hearing

# RIVER WATER TESTING

- TAUNG TA MAN LAKE
  - Test (10) samples
  - Some samples -Mercury, Ammonia Nitrogen, Ionized Ammonia -Increased above reference value
- DOKE HTA WADDY RIVER
  - Test (5) samples
  - Phenol - Increase above reference value

# WASH STRATEGY AND INVESTMENT PLAN

# WASH IN HEALTH FACILITIES

## SCOPE OF HEALTH FACILITIES

- TOWNSHIP HOSPITALS
- STATION HOSPITAL
- RURAL HEALTH CENTRES
- SUB-HEALTH CENTRES

## COMPONENTS

(A) WATER SUPPLY IN HEALTH FACILITIES

(B) SANITATION IN HEALTH FACILITIES

(C) CLINICAL AND HAZARDOUS WASTE DISPOSAL

(D) WASTE WATER DRAINAGE, TREATMENT AND DISPOSAL

# CAPITAL EXPENDITURES FOR HEALTH FACILITIES WASH, 000 US$

| Level | Annual average | | | | | Total (2017-2030) |
|---|---|---|---|---|---|---|
| | Water supply | Toilets | Wastewater treatment | Clinical waste | Total | |
| Sub-Health Centers | 1,717 | 7,312 | - | - | 9,028 | 126,396 |
| Rural Health Centers | 625 | 2,739 | - | - | 3,363 | 47,089 |
| Station Hospitals | 345 | 821 | 170 | - | 1,336 | 18,705 |
| Township Hospitals | 184 | 1,350 | 151 | 384 | 2,068 | 28,952 |
| **Total** | **2,870** | **12,221** | **321** | **384** | **15,796** | **221,142** |

***THANKS FOR YOUR ATTENTION***