

X

EARLY INFORMATION SYSTEM ACTION GUIDELINE

Table of Contents

| | | |
|-----|--|----|
| 1 | Correcting of data of rainfall, road traffic obstacle..... | 1 |
| 1.1 | Rainfall data..... | 1 |
| 1.2 | Correction of traffic obstacle information | 2 |
| 2 | Processing/Judgment of Road Early Information Should be provided..... | 4 |
| 2.1 | Judgment of Early Warning Information by Heavy Rain | 4 |
| 2.2 | Judgment of Early Warning by Serious Disturbance of Disaster on Road Slopes/ Foundation | 7 |
| 2.3 | Judgment of Traffic Obstacle Information | 9 |
| 3 | Dissemination of Information | 10 |
| 3.1 | Early Warning under Heavy Rain, Serious Disturbance of Disaster on Road Slope/ Foundation | 10 |
| 3.2 | Road Traffic Obstacles | 14 |
| 4 | Maintenance of equipment..... | 17 |
| 4.1 | Automatic Rain Gauges..... | 17 |
| 4.2 | Manual Rain Gauge | 18 |
| 4.3 | Computer (CDMA phone UPS) | 19 |

Appendix

1. Narayangharh-Mugling (N-M) Highway Road Early Information System
Application Manual for District Police Office
2. Narayangharh-Mugling (N-M) Highway Road Early Information System
Application Manual for Divisional Road Office
3. Narayangharh-Mugling (N-M) Highway Road Early Information System
Application Manual for Kabilash Village Development Committee

X. NARAYANGHARH-MUGLING (N-M) HIGHWAY ROAD EARLY INFORMATION SYSTEM OPERATION MANUAL

1. Correcting of data of rainfall, road traffic obstacle

1.1. Rainfall data

Responsible organization: District Road office, Kabilash Village Development Committee

Two (2) automatic data correction rain gauges and computers with data loggers are set at Division Road Office (0km at N-M highway) and Kabilash village development committee office.

Manual rain gauges are also set at five (5) locations along N-M highway to grasp rainfall difference of location, and or subservience of automatic data correcting rain gauges.

Rain gauges locations are shown in Figure 1. Method of data correction is shown in Table 1 and Table 2.

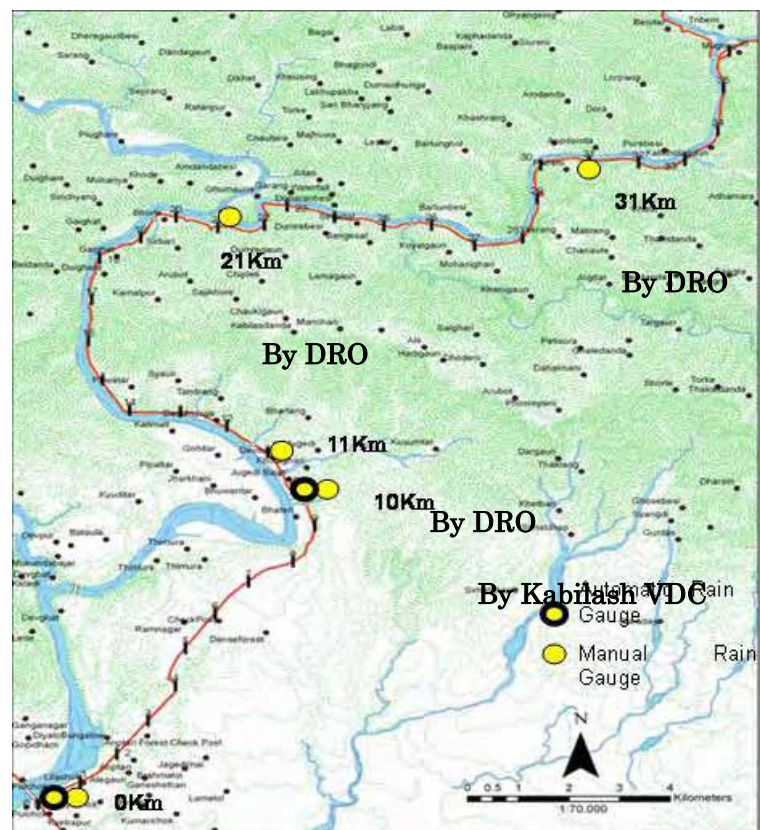


Figure 1 Location of Rain Gauge

Table 1 Method of Data Correction (Automatic Rain gauge)

| Item | Description |
|-------------------------------------|--|
| Frequency | Each hour automatically |
| Data corrected | Hourly rainfall |
| Location | District Road office : 0Km Kabilash VDC : 10Km |
| Correction method /recording method | Automatic rain gauges send hourly rainfall to data loggers, which directly connected to computer, by radio connection. |

Table 2 Method of Data Correction (Manual Rain Gauge)

| Item | Description |
|------------------------|--|
| Frequency | Each day (Morning) |
| Information corrected | Daily rainfall |
| Location | Five locations Division road office : 0 km, 11 km, 21 km, 31km Kabilash Village Development Committee: 10 km |
| Data Correction method | Persons responsible to measure manually accumulated water in bottle by measuring cylinder |
| Recording method | Input in Excel format |

1.2. Correction of traffic obstacle information

Correction method of traffic obstacle information is shown in Table 3.

Table 3 Correction of Traffic Obstacle Information

| Item | Description |
|-------------------------------|---|
| Frequency | Each occurrence of road traffic obstacles, dissolution |
| Information corrected | - Serious disturbance of road slope disaster (frequent rock falls, visible hourly/ daily opening cracks on roads/road slopes) - Road construction works - Road closure of partial width, Road closure of full width, traffic jam) - Cause (slope disaster, traffic accident, strike etc.) - Location (Chainage), confirm time |
| Information correction method | Eye observation |
| Informer | Staff of division road office, supervisors and length workers who assigned by division road office, and inhabitants, drivers. |
| Information addressees | - Police office/station (District police office, 1km Anptari station, 36km Mugling office) directly or via division road office. |
| Information method | Informers report traffic obstacles to police office/station (district police office, 1km Anptari station, 36km Mugling office) directly or via division road office. CDMA phone is available at 10 km, Kabilash VDC, and 31km by supervisor. |

Information Addressee : District Police Office

Information addressee records the traffic obstacles in information ledger.

Table 4 Recording of the Information

| Item | Description |
|--------------------|--|
| Frequency | Every informed time |
| Information Kind | road traffic obstacles (Road closure of partial width, Road closure of full width, traffic jam) - Cause (slope disaster, traffic accident, strike etc.) - Location (Chainage) , confirm time |
| Information ledger | Paper and Excel format |

Table 5 Information Ledger

| Informed Time | Location (Chainage) | Affiliation of informer | Informer | Situation | Remark |
|---------------|---------------------|-------------------------|----------|-----------|--------|
| | | | | | |
| | | | | | |

2. Processing/Judgment of Road Early Information Should be provided

2.1. Judgment of Early Warning Information by Heavy Rain

Responsible Organization : Division Road Office (DRO) , Kabilash Village Development Committee (VDC)

Person responsible of DRO/Kabilash VDC

- Process hourly rainfall into 12 hour half-value rainfall amount by computation tool
- Upload latest graph/value of 12 hour half-value rainfall amount into web-page (<http://nmroad.gov.np>) when 12 hour half-value rainfall amount is over 60mm
- Confirm warning level by table of warning threshold of heavy rain as shown in Table 8.
- Inform latest warning level to DPO when level is changed.

Table 6 Judgment of rainfall information

| Item | Description |
|-----------------|---|
| Timing | Normal times : once a day Rainfall(Table 7) : Continuous 'normal rain or less' of 5 hour Continuous 'a little strong rain or less' of 2 hour Continuous 'strong rain or more' of 0.5 hour |
| Judgment Method | <u>Processing of 12 hour half-value rainfall amount (prediction value of one hour later)</u> By input hourly rainfall into the computation program. <u>Judgment</u> Judged by processed rainfall amount and table of warning threshold of heavy rain (Table 8) . |
| Action | Inform latest warning level when level is changed. |

Table 7 Necessity of Processing of 12 Hour Half-value Rainfall Amount by Sense of Rainfall Strength

| Rainfall Intensity (mm/hour) | Categories of Rainfall Intensity | Sense of Rainfall Situation* | Necessity of Processing of 12 Hour Half-value Rainfall Amount |
|------------------------------|----------------------------------|---|---|
| Under 3 | Small rain | ➤ Wet road surface | - |
| 3-10 | Normal rain | ➤ Rainy sound will be listened ➤ Water pond will be come out | Continuous 'normal rain or less' of 5 hour |
| 10-20 | A little strong rain | ➤ Rains with rushing sound ➤ Feet be get wet by splashing from ground ➤ Water ponds come out in many places on the ground | Continuous 'a little strong rain or less' of 2 hour |
| 20-30 | Strong rain | ➤ Rains as cat and dogs ➤ Umbrella lost function ➤ Difficult to look forward even quick wiper | Continuous 'strong rain or more' of 0.5 hour |
| 30-50 | Heavy rain | ➤ Rains as turned out bucket ➤ Road becomes as river ➤ No break control on highs speed cars | |
| 50-80 | Very heavy rain | ➤ Rain like water fall with strong rushing sound ➤ Bad visibility due to white out and splashing ➤ Driving is impossible | |
| Over 80 | Terrible rain | ➤ Feel breathless oppression and fear for strong rain | |

Modified from the table provided by Japan Metrological Agency

Table 8 Threshold of Early Warning by Modified Rainfall Amount

| Early Warning Level | Threshold of rainfall | Action | |
|---------------------|---|--|---|
| | | For road User | For Kabilash Villagers |
| Level IV | 12 hour half –value rainfall amount =180mm Ten (10) year return period | Warning Notice: Recommendation to avoid traffic on the road | Warning Notice: Recommendation to evacuation on specific inhabitants of dangerous area until '12 hour half-value rainfall is under Level I |
| Level III | 12 hour half –value rainfall amount =140mm Five (5) year return period | Caution Notice: Recommendation to careful passage on the road | |
| Level II | 12 hour half –value rainfall amount =80mm Two (2) year return period | Same as Level I | Caution Notice: Recommendation of preparation of evacuation of specific inhabitants of dangerous area. Recommendation of avoid transference in Village (students wait home, or school) |
| Level I | 12 hour half-value rainfall amount =60mm (One (1) year return period) | Preparation call up staff/workers/equipment for emergency action by division road office | Preparation Announce to Early Warning/Evacuation Team and word representatives |
| Level 0 | 12 hour rainfall is over 60 mm | processing/upload to web-page of modified rainfall amount | |

2.2. Judgment of Early Warning by Serious Disturbance of Disaster on Road Slopes/Foundation

Responsible Organization : District Police Office

District police office (DPO) confirms the situation of serious disturbance for road traffic which is informed by patroller dispatched from Anptari police station or Mugling police office.

DPO judge contents of early warning information should be disseminated.

DPO also judge remove of road obstacle information when the disturbance is resolved.

Table 9 Judgment of Early Warning by Serious Disturbance

| Item | Contents |
|--------------|---|
| Frequency | Every time serious disturbance occurred |
| Confirmation | DPO direct to Anptari police box or Mugling police office dispatching patroller the site where serious disturbance might happen. Patrollers report the situation. |
| Judgment | DPO judge the necessity/contents of early warning dissemination. |

Table 10 Decision Reference of Early Warning by Serious Disturbance

| Serious disturbance of disaster on road /slope | Situation | | |
|--|---|--|---|
| | By Direction at Site | By Notice Board/ Web-page | |
| | Traffic Stop Control: Forcible traffic stop | Warning Notice: Recommendation to avoid traffic on the road | Caution Notice: Recommendation to careful passage on the road |
| Rock fall/Rock Mass Fall | Rock falls of over 10cm diameter on the carriageway occurs more than one per hour There are visible movement and crack opening on rock mass that will fall on carriage way | Rock falls of over 10 cm diameter on the carriageway occurs more than five per day | Rock falls of over 10 cm diameter on the carriageway occurs more than one per day |
| Slope Failure, Slide | There are visible movement and crack opening on soil mass that will fall on carriage way | Soil collapse of over 0.5m ³ occurs more than five times per day | Soil collapse of over 0.5 m ³ occurs more than once per day |
| Road Foundation Failure | There are visible movement in cracks in cartridge way. | There are faulting of 10cm or more in cracks in cartridge way. | There are faulting 5 cm or more in the crack in cartridge way |
| Debris Flow | Debris flow occurrence is obviously by eyewitness, or sound | Warning by rainfall threshold | |

2.3. Judgment of Traffic Obstacle Information

Responsible Organization : District Police Office

District police office (DPO) confirms the situation of road traffic obstacles which is informed by patroller dispatched from Anptari police station or Mugling police office.

DPO judge contents of traffic obstacle information should be disseminate

DPO also confirm remove of traffic obstacle information when the obstacle is resolved.

Road notice board is set at vicinity of police station Anptari on Chainage 1 km and Mugling Intersection at 36km

Table 11 Judgment Road Traffic Obstacles

| Item | Contents |
|--------------|---|
| Frequency | Every time road information received |
| Confirmation | DPO direct to Anptari police box or Mugling police office dispatching patroller the site where road traffic obstacle might happen. Patrollers report the situation. |
| Judgment | DPO judge the contents of information disseminated by internet web-page and road notice board. |

3. Dissemination of Information

3.1. Early Warning under Heavy Rain, Serious Disturbance of Disaster on Road Slope/Foundation

Responsible Organization : DPO, Anptari Police Box , Mugling police office

DPO disseminates message on two notice boards (Anptari and Mugling) and internet web-page as 'waning notice: not to pass through' or 'caution notice: caution to pass through' when DRO and Kabilash VDC informed to DPO result of their automatic rainfall monitoring.

DPO will changes the early warning information when warning level is changed. In case of warning level is different between DRO rain gauge and Kabilash VDC rain gauge, severe one (warning is sever than caution) should be disseminated.

Table 12 Dissemination of Early Waning

| Item | Description |
|-----------------------|---|
| Frequency | Each time when warning level is changed |
| Confirmation method | Heavy rain: No need Serious disturbance of disaster on road slope/ foundation: Site confirmation by patroller of DPO |
| Dissemination method | <u>Road Notice Board</u> Chainage 1km by Anptari police box Chainage 36km Mugling police station <u>Internet web-page</u> DRO make contents and upload to internet web-page |
| Dissemination content | (shown in Table 13) |

method of upload is shown in Appendix 1: Appreciation manual for Division Police Office

Table 13 Disseminate Information

| Item | By Internet Webpage | By Notice board |
|---|--|---------------------|
| Kind | - Warning Notice: Not to Pass Through - Caution Notice: Caution to Pass Through | Same as on the left |
| Cause | - Heavy rain 10 year at once - Heavy rain 5 year at once | Heavy rain |
| | - Serious Disturbance of Disaster on Road Foundation/Slope | |
| Location | (For heavy Rain) Chainage 10 Km from 36Km (Fixed) | Same as on the left |
| | (For serious Disturbance) From Bharatpure/Anptari/Mugling/LLL <i>nn</i> km to <i>mm</i> km (LLL: Specify location; <i>nn, mm</i> : 0 – 36) | |
| Disseminate Time | Noticed from : <i>hh</i> AM/PM <i>dd</i> MMM <i>yyyy</i> (<i>hh</i> : 1 – 12, <i>dd</i> : 1-31) | Same as on the left |
| Hourly fluctuation graph Modified Rainfall Amount | 12 hour half-value rainfall amount of DRO (chainage 0 km) and Kabilash VDC (chainage 10km) today and past 6 days (total 7 days) | — |

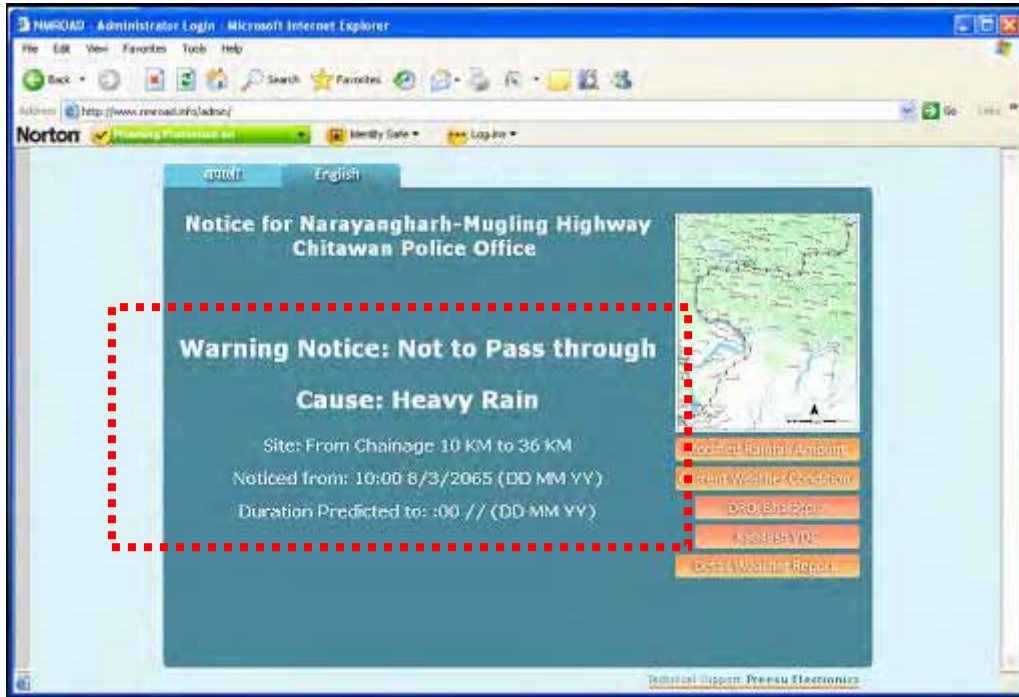


Figure 2 Web-page Image of Early Warning

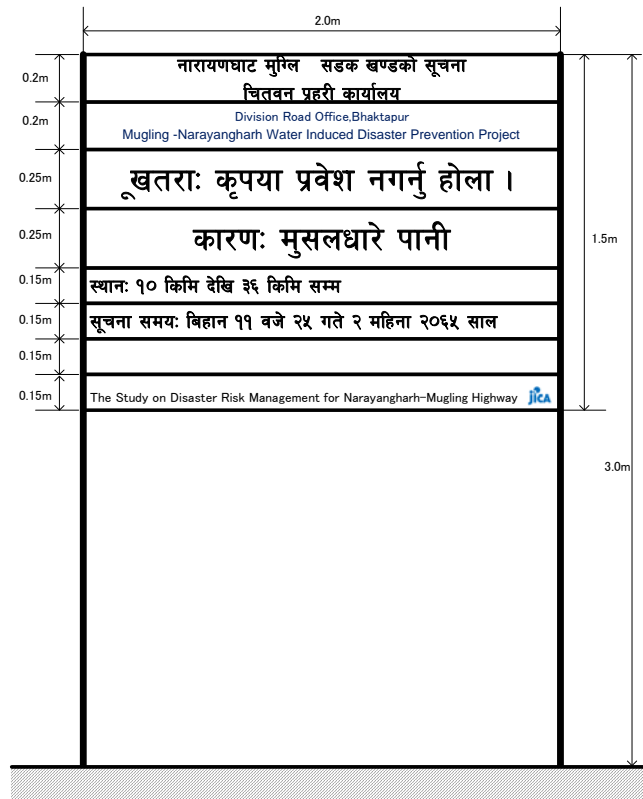


Figure 3 Notice Board Image

Responsible Organization : DRO, Kabilash VDC

DRO and Kabilash VDC formulate and upload to hourly fluctuation graph of '12 hour half-value rainfall amount' once a day and when 'simple 12 hour rainfall amount' is over 60mm.

Table 14 Dissemination of Rainfall Status

| Item | Description |
|----------------------|---|
| Frequency | Not Heavy Rain; Once a day Heavy Rain : Data logger of automatic rain gauges notice to responsible person by mobile phone mail or buzzer when simple rainfall amount is over 60 mm) |
| Dissemination method | <u>Internet</u> DOR and Kabilash VDC compute hourly fluctuation graph of '12 hour half-value rainfall amount' and predicted value of it of one hour later, and upload them to web-page |

method of computation and uploading to internet web-page is shown in Appendix2: Application Manual for Divisional Road Office, Appendix3: Application Manual for Kabilash VDC Road Office, Appendix 4: Computation Manual for Modified Rainfall Amount.

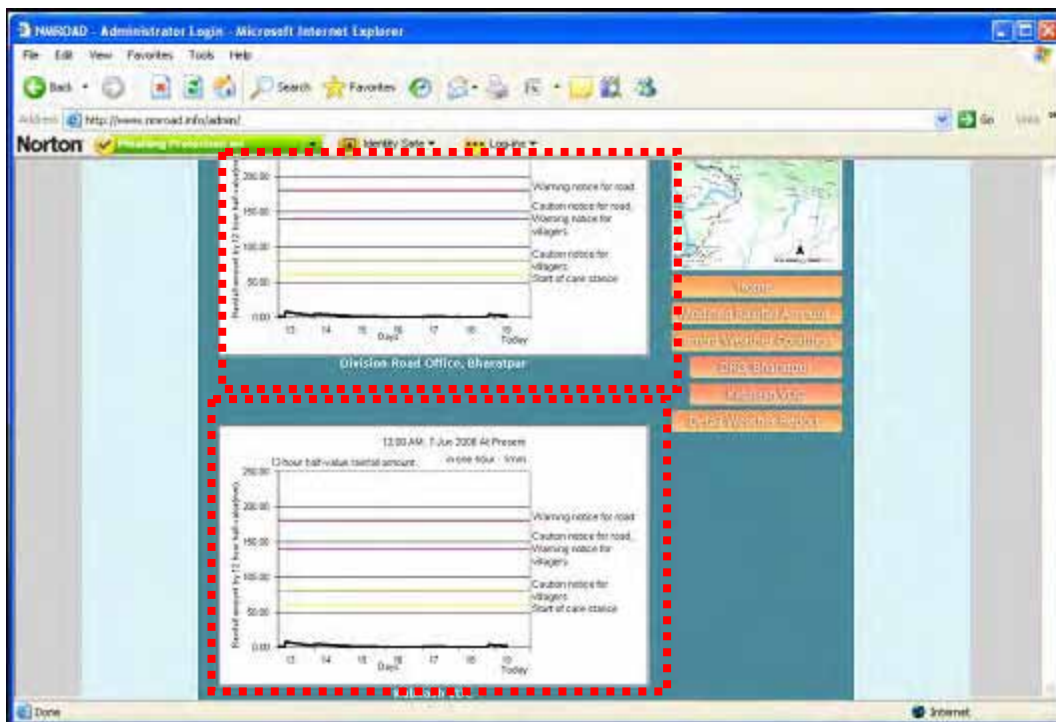


Figure 4 Web-page Image of Rainfall Status (fluctuation graph)

3.2. Road Traffic Obstacles

Responsible Organization: (DPO, Anptari Police Box , Mugling police office)

DPO carries down road obstacle information to Anptari police box and Mugling police office. Anptari police box and Mugling police office display road traffic obstacles on the notice boards.

DPO also same information put on the internet web-page.

DPO remove the information when road traffic obstacles are dissolved.

Table 15 Dissemination of Road Traffic Obstacles

| Item | Description |
|----------------------|---|
| Frequency | Each time when DPO confirmed road traffic obstacles |
| Dissemination Method | <u>Road notice board</u> <ul style="list-style-type: none"> • Chainage 1km, Anptari police box display information • Chainage 36km, Mugling police office display information <u>Internet Web-page</u> <ul style="list-style-type: none"> • DPO formulate information contents and upload |
| Information Contents | Shown in Table 13 |

※ method of contents formulation and uploading to internet web-page is shown in Appendix 1: Application Manual for District Police Office

Table 16 Contents of Road Traffic Obstacle Information

| Item | Description on Web-page | Description on Notice bored |
|---------------------------------|---|-----------------------------|
| Status of Road traffic Obstacle | Road closure of full width Road closure of partial width Traffic Jam | Same as on the left |
| Cause | Water-Induced Disaster Road Slope Disaster Destruction of Road Traffic Accident Strike Road Construction Works | |
| Location | From Bharatpure/Anptari/Mugling/LLL <i>nn</i> km to <i>mm</i> km (LLL: Specify location; <i>nn</i> , <i>mm</i> : 0 – 36) | |
| Notice from | <i>hh</i> AM/PM <i>dd</i> MMM <i>yyyy</i> (<i>hh</i> : 1 – 12, <i>dd</i> : 1-31) | |
| Duration Predicted to | <i>hh</i> AM/PM <i>dd</i> MMM <i>yyyy</i> (<i>hh</i> : 1 – 12, <i>dd</i> : 1-31) | |

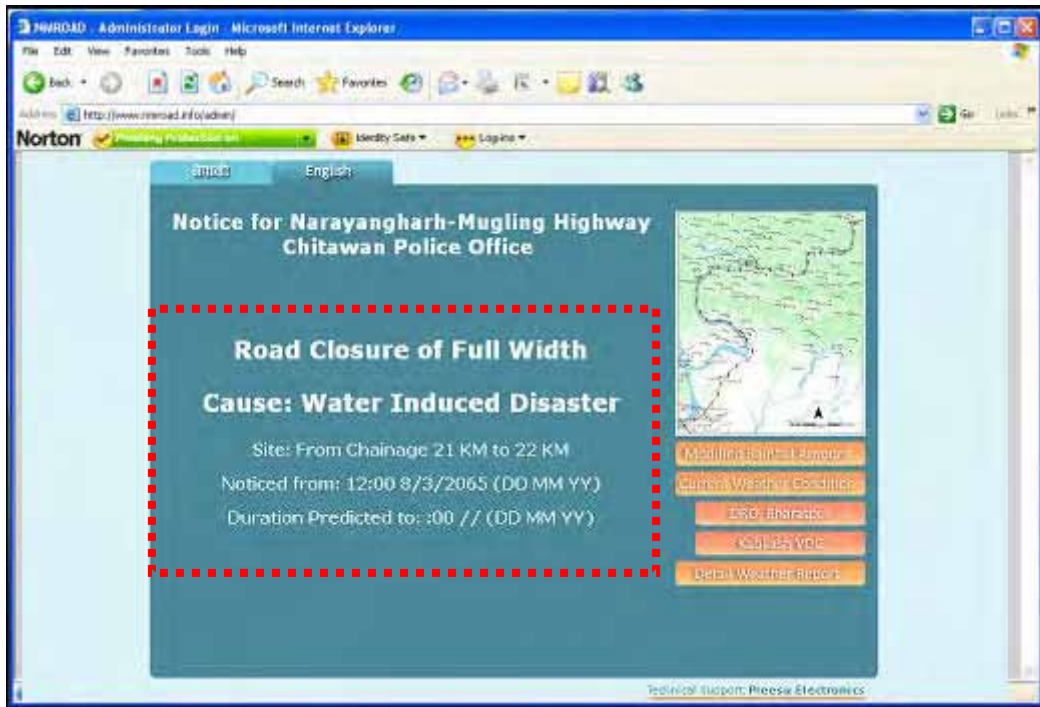


Figure 5 Web-page Image of Road Traffic Obstacles

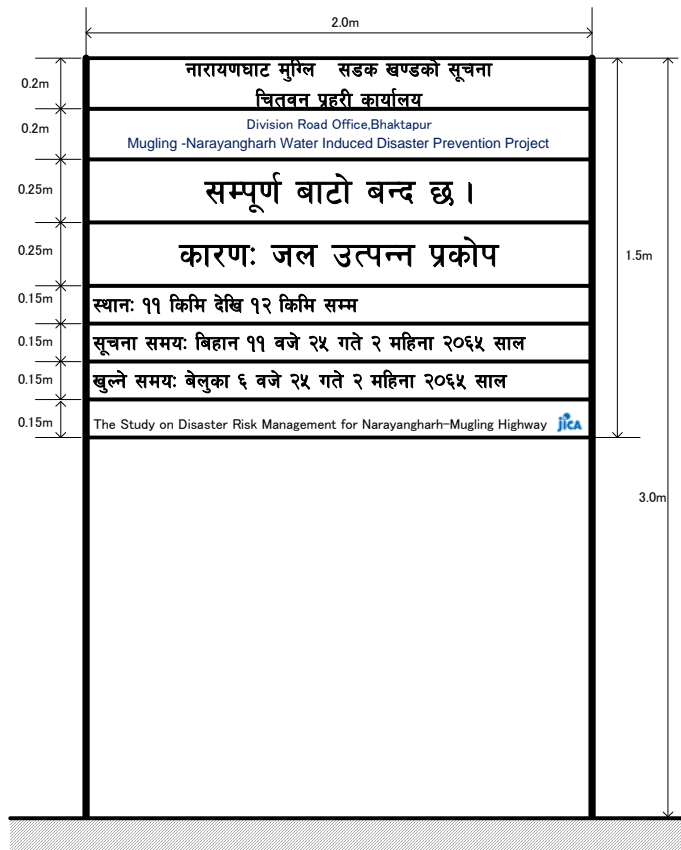


Figure 6 Notice Board Image of Road Traffic Obstacles

4. Maintenance of equipment

4.1. Automatic Rain Gauges

Responsible Organization : DRO,

Kabilash Village (Support by Mugling –Narayangharh water-Induced disaster prevention project office and or division No.3 office of DWIDP)

(1) Daily Check

Daily maintenance will be conducted follows

Table 17 Daily Maintenance of Automatic Rain Gauge

| Item | Description |
|--------------------------|--|
| Frequency | Once a day |
| Responsible Organization | DRO (Chainage 0 km) : DRO Kabilash VDC (Chainage 10 km) : Kabilash VDC Support by Mugling –Narayangharh water-Induced disaster prevention project office and or division No.3 office of DWIDP |
| Check item | - Setting status (not inclined) - existence of data in data logger - availability of display of hourly rainfall by computer |

(2) Response on Abnormal Situation

Contact of responsible organization, electronic company, (Mr. Surendra Mathema Preesu electronics (tel 01-4270963, fax 01-4288886, e-mail: suyash@info.com.np)

4.2. Manual Rain Gauge

(1) Daily Check

Table 18 Daily Check

| Item | Description |
|------------------|---|
| Frequency | Once a day |
| Setting location | District road office of Chainage 0km, Kabilash VDC Chainage 10km, Chainage 11 km, Chainage 21 km, Chainage 31km |
| Check item | - Setting status (not inclined) - leakage of water holder - clogging of funnel |

(2) Response on abnormal situation

In case of difficult to repair, contact to responsible organization or electronic company, (Mr. Surendra Mathema Preesu electronics (tel 01-4270963, fax 01-4288886, e-mail: suyash@info.com.np)

4.3. Computer (CDMA phone UPS)

Responsible organization : DPO, DRO, Kabilash VDC

(1) Continuous registration of anti virus soft ware

Responsible organization update of anti virus soft ware once a year.

(2) Response to failure situation

Soft wears are re-installed by install manuals.

Mechanical failure will be informed computer mending service shop.

Appendix 1

Narayangharh-Mugling (N-M) Highway

Road Early Information System Application Manual

(for District Police Office)

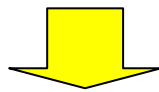
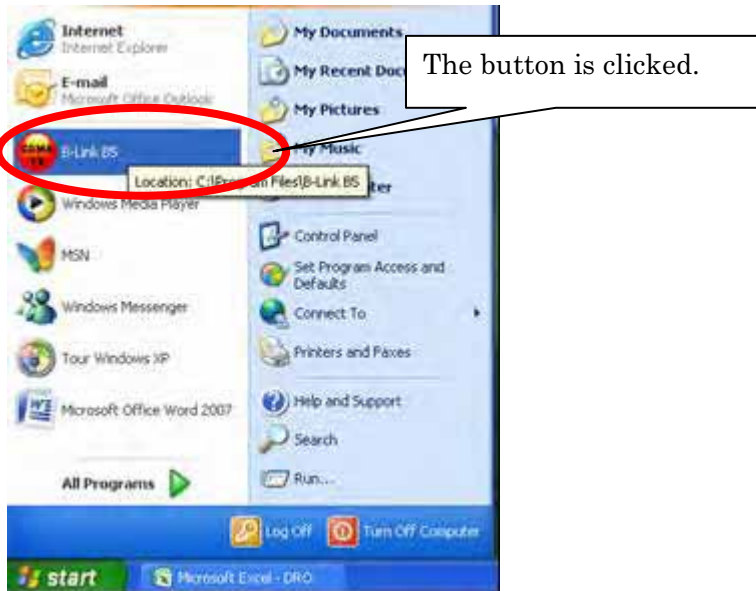
Contents

| | |
|--|---|
| 1. The Internet connection ("B-Link") | 2 |
| 2. Update of Web page ("Internet Explore") | 4 |

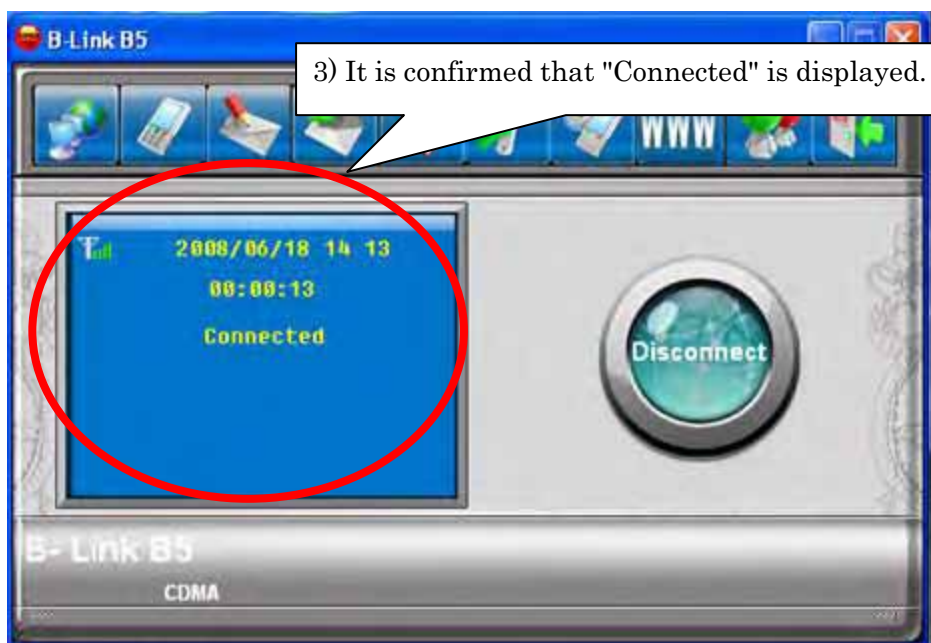
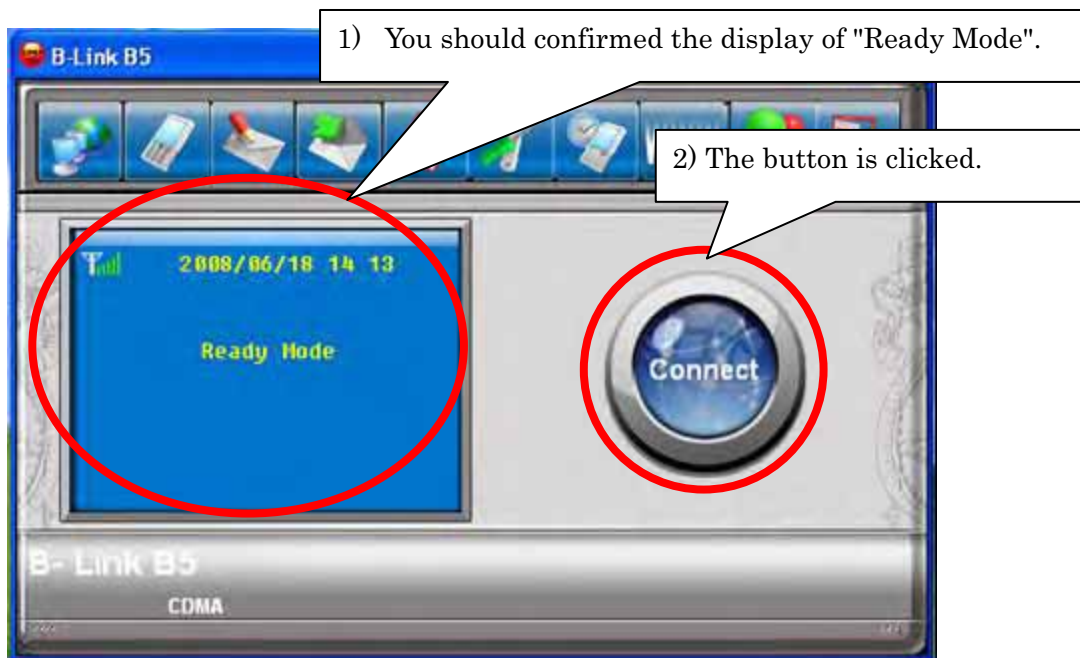
1. The Internet connection ("B-Link")

1.1. Starting-up of software

Software "B-Link" is started.



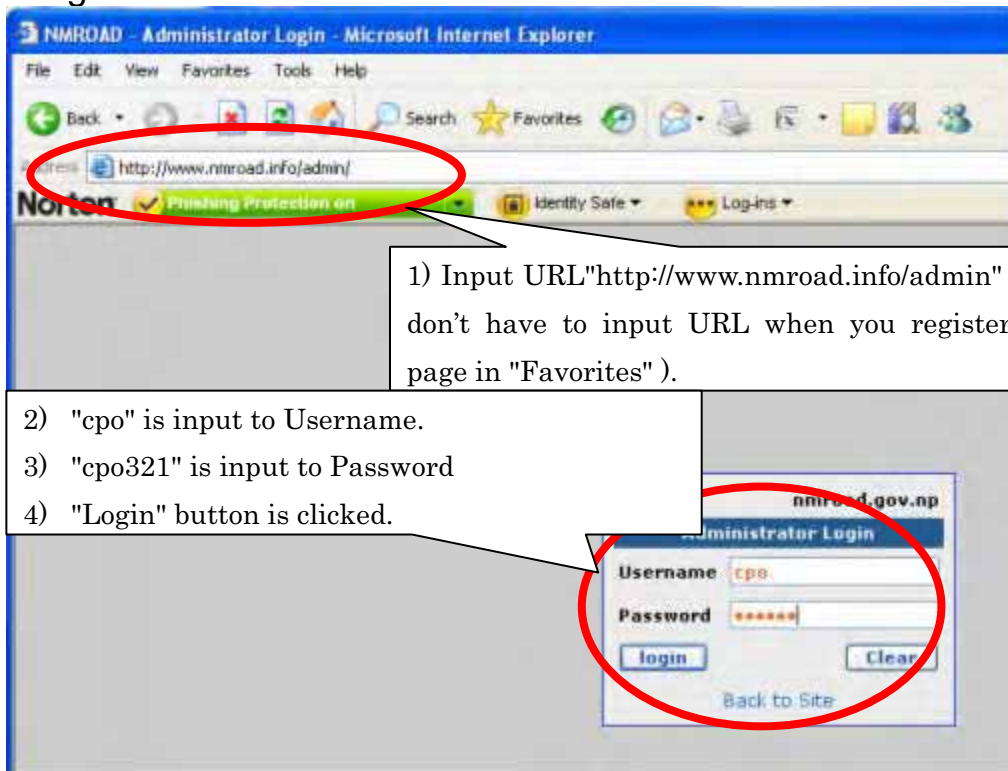
1.2. The Internet connection



You must click "Disconnect" after the up-loading of the file.
Internet is connected with CDMA of the prepaid type

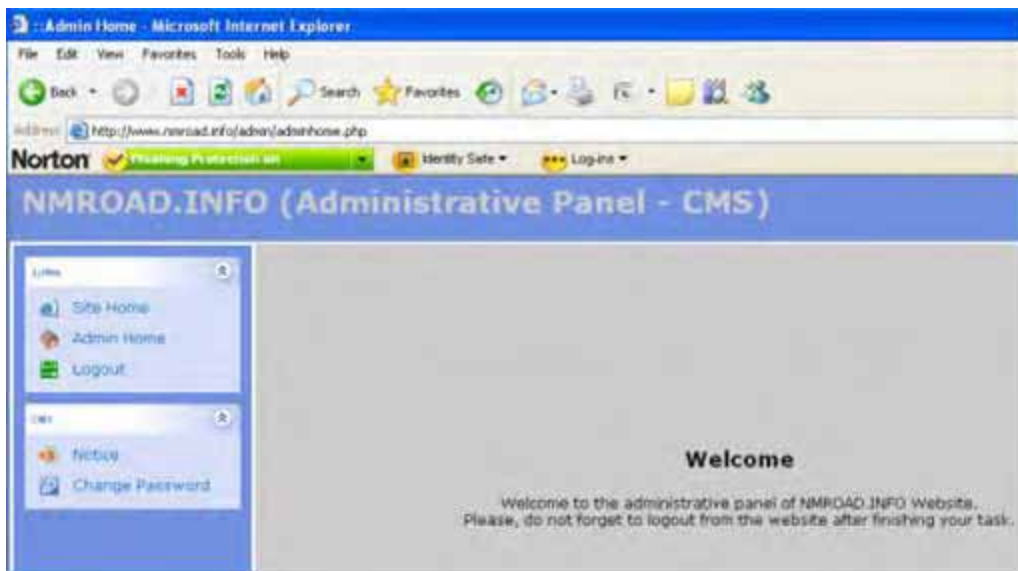
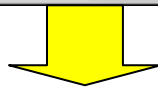
2. Update of Web page ("Internet Explore")

2.1. Log-in



1) Input URL "http://www.nmroad.info/admin" (You don't have to input URL when you register the page in "Favorites").

2) "cpo" is input to Username.
3) "cpo321" is input to Password
4) "Login" button is clicked.



Admin Home - Microsoft Internet Explorer

http://www.nmroad.info/admin/adminhome.php

NMROAD.INFO (Administrative Panel - CMS)

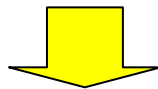
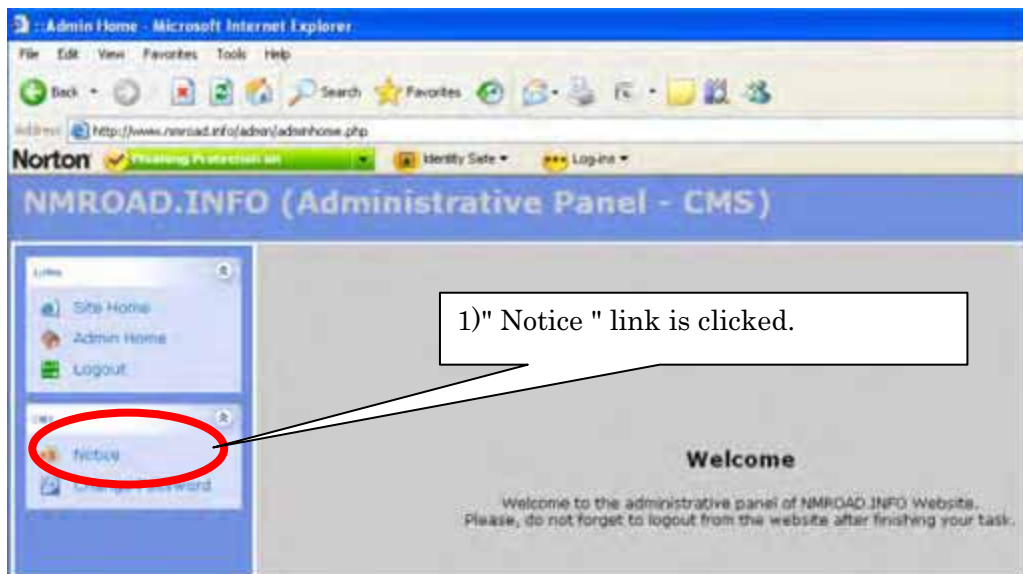
Site Home
Admin Home
Logout

New
Change Password

Welcome

Welcome to the administrative panel of NMROAD.INFO Website.
Please, do not forget to logout from the website after finishing your task.

2.2. Update of Web Information Displayed (message)



2) For newly upload or renewal, select [Yes]

For delete content displayed, select [No], and 「The road is open.」 is displayed on the web page.

Update Notice

Display Notice Yes

HEAVY RAIN INFORMATION

Message

Cause

Road Sector

From Others (km to) (km)

Noticed from (HH) (DD) (MM) (B.S.)

TRAFFIC OBSTACLE INFORMATION

Message

Cause

Road Sector

From Mugling Please type here

3 (km to) 5 (km)

Noticed from 11 (HH) 14 (DD) 5 (MM) 2065 (B.S.)

Duration Predicted to 17 (HH) 14 (DD) 5 (MM) 2065 (B.S.)

OTHER INFORMATION/NOTICE

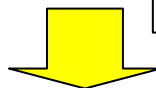
Detail the Road is open .

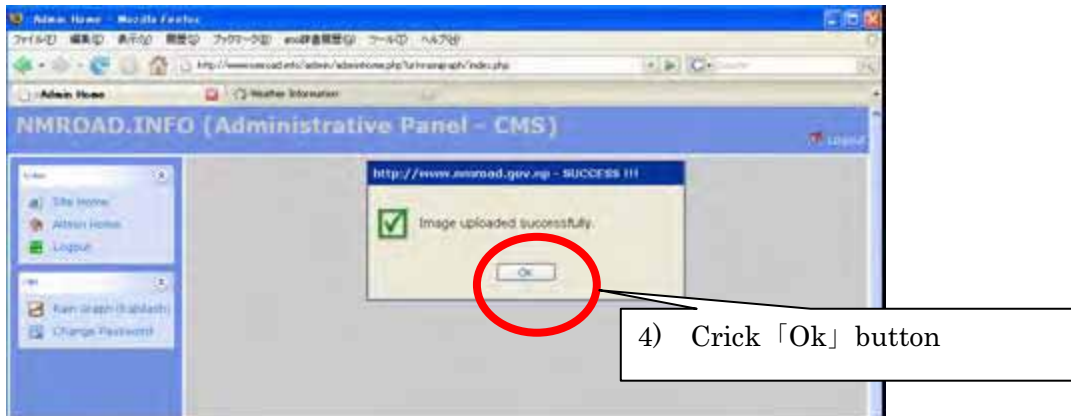
Submit

3) Select information to display on the Web page from dropdown menus

5) click submit button

4) Please input the content displayed on the Web page if necessary.



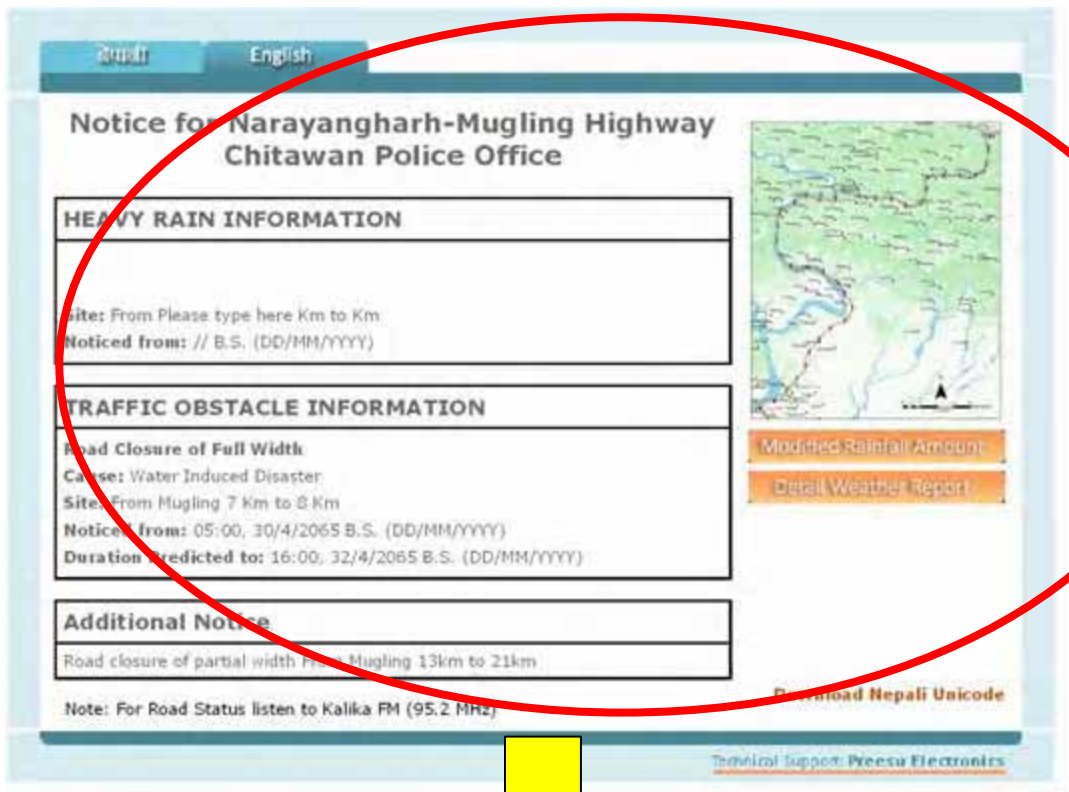
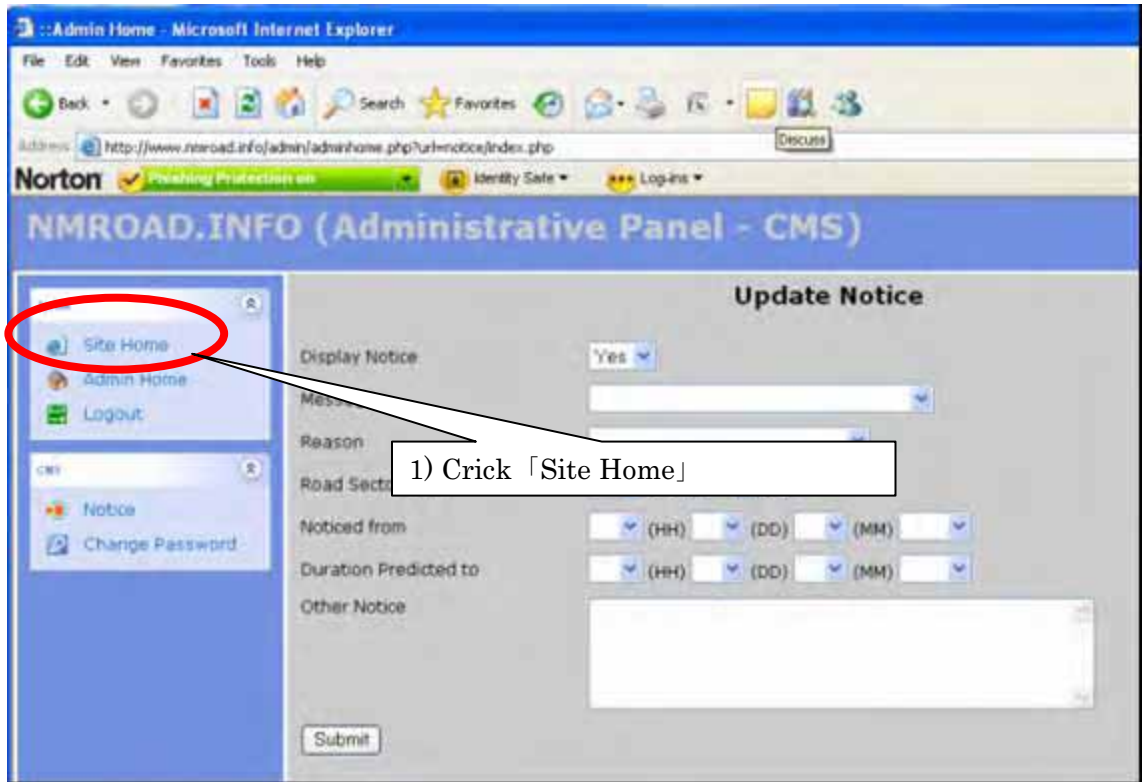


| No | kind | Contents |
|-----------------------|--|--|
| Message | Warning/Caution Notice | <ul style="list-style-type: none"> Warning Notice : Not to Pass through Caution Notice : Caution to Pass through |
| | Traffic Obstacle Information | <ul style="list-style-type: none"> Road Closure of Full Width Road Closure of Partial Width Traffic Jam |
| Reason | Warning/Caution Notice | <ul style="list-style-type: none"> Cause : Heavy Rain Cause: Serious Disturbance on Road Slope/Foundation |
| | Traffic Obstacle Information | <ul style="list-style-type: none"> Cause : Water-Induced Disaster Cause: Road Slope Disaster Cause: Destruction of Road Cause : Traffic Accident Cause : Strike Cause: Road Construction Works |
| Road Sector (KM) | Common | <ul style="list-style-type: none"> Site : From Bharatpure/Anptari/Mugling <i>nn</i>Km to <i>mm</i>Km (Heavy Rain Information is only “From Bharatpure 10Km to 36Km”) |
| Noticed from | Common | <ul style="list-style-type: none"> Noticed from : <i>hh</i> AM/PM <i>dd</i> <i>MMM</i> <i>yyyy</i> |
| Duration Predicted to | Warning/Caution Notice | Blank |
| | Warning/Caution Notice Traffic Obstacle Information | <ul style="list-style-type: none"> Duration Predicted to : <i>hh</i> AM/PM <i>dd</i> <i>MMM</i> <i>yyyy</i> |

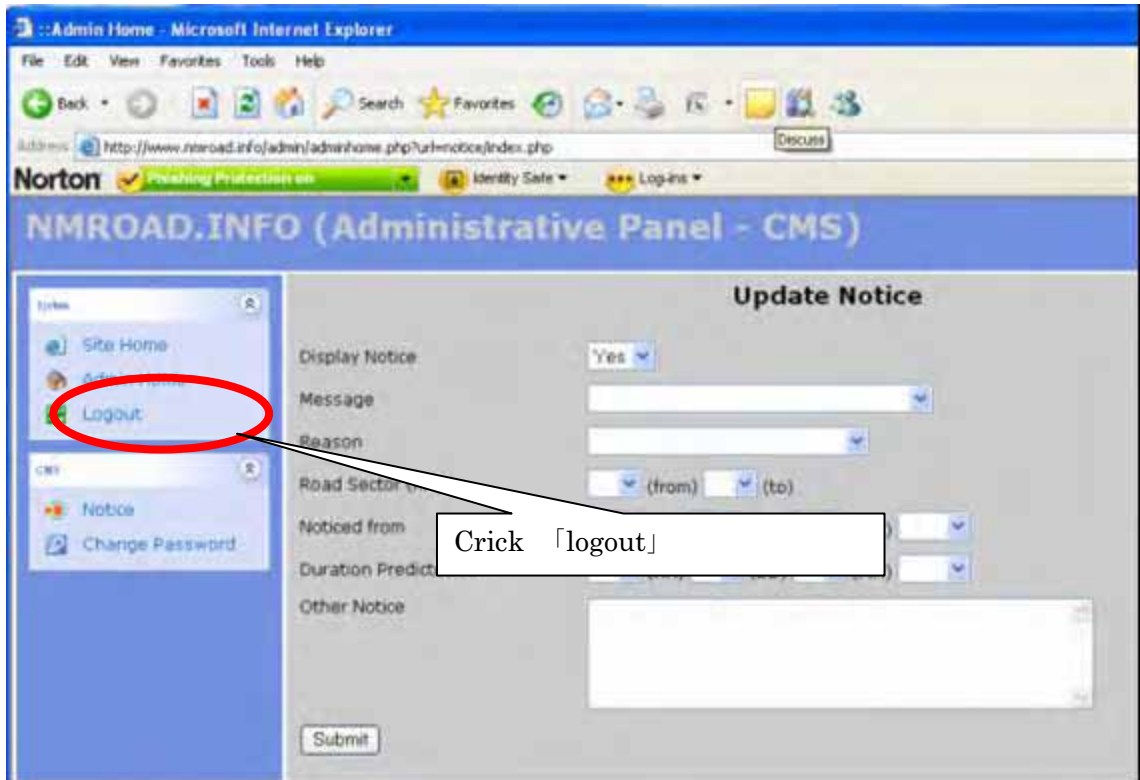
nn,mm : :0~36
hh : 1~12
dd : 1~31
MMM : Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec
yyyy : 2008~2999

Selection from three

2.3. Confirmation of Renewal Information



2.4 Log-out



Appendix 2

Narayangharh-Mugling (N-M) Highway

Road Early Information System Appreciation Manual

(for Division Road Office)

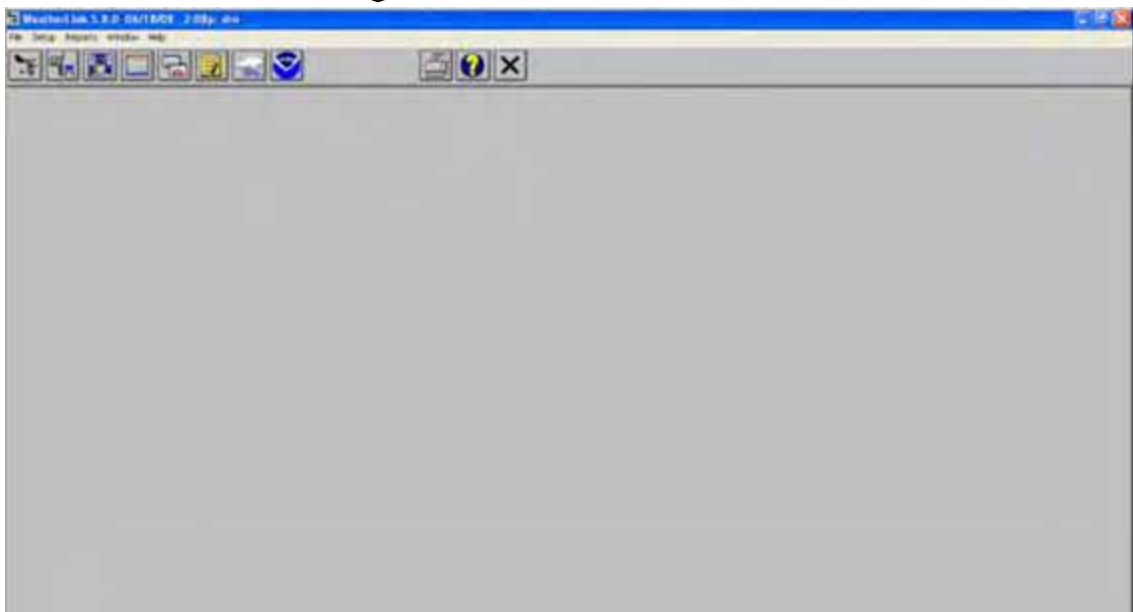
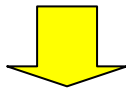
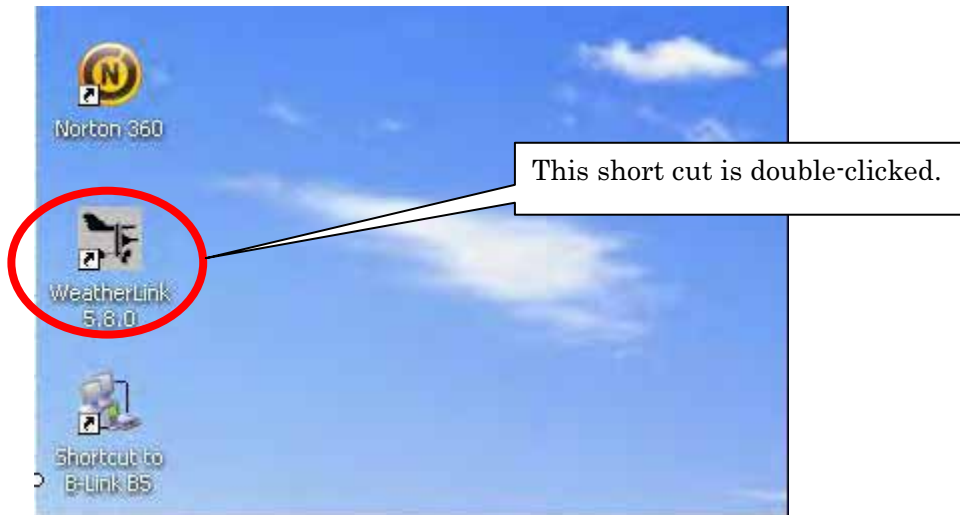
Contents

1. Confirmation of hourly rainfall ("Weather Link")
2. Calculation of 12 hour half -value rainfall amount and making of graph picture file ("Hourly Rainfall")
3. The Internet connection ("B-Link")
4. Up-loading of graph picture file to Web page ("Internet Explore")

1. Confirmation of Hourly Rainfall ("Weather Link")

1.1. Start of Software

Software "Weather Link" is started.



1.2. Download and Display of Hourly Rainfall

The hourly rainfall and other metrological data are downloaded from the data logger (console).

The button is clicked.

| Date | Time | Rain |
|---------|--------|------|
| 6/17/08 | 7:00a | 0.00 |
| 6/17/08 | 8:00a | 0.00 |
| 6/17/08 | 9:00a | 0.00 |
| 6/17/08 | 10:00a | 0.00 |
| 6/17/08 | 11:00a | 0.00 |
| 6/17/08 | 12:00p | 0.00 |

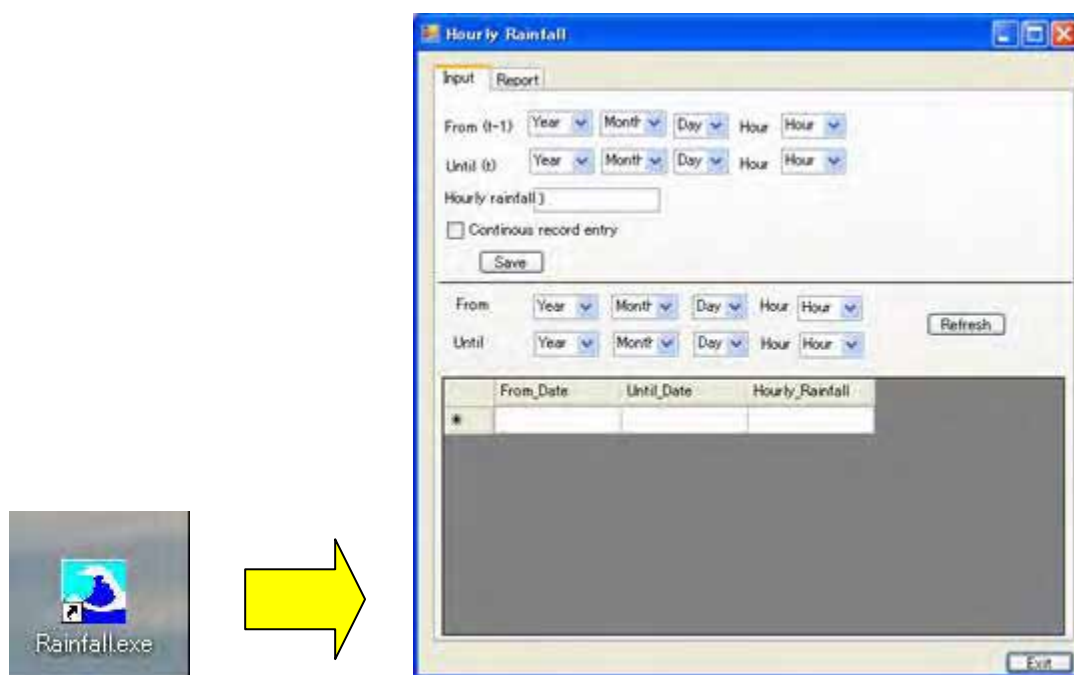
Please confirm three rows ("Date" and "Time" and "Rain").

2. Calculation of 12 Hour Half - Value Rainfall Amount and Making of Graph Picture File ("Hourly Rainfall")

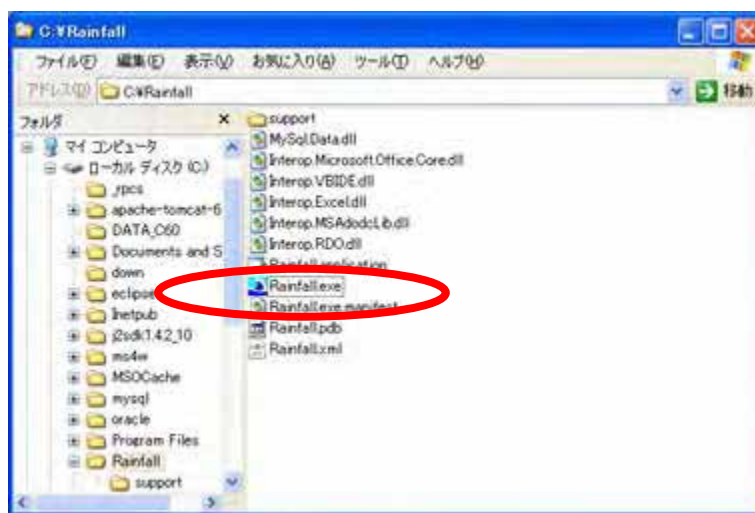
2.1. Start of Software

The start of the tool is as follows.

The "Rainfall.exe" short cut in desktop is double-clicked.



Please double-click "Rainfall.exe" that exists in the "Raifall" folder of C drive when the short cut of a top disk doesn't exist.



2.2. Input of Hourly Rainfall

The screenshot shows the 'Hourly Rainfall' software interface. It has two tabs: 'Input' and 'Report'. The 'Input' tab is active. The interface includes the following elements:

- 'From (t-1)' and 'Until (t)' sections, each with dropdown menus for Year, Month, Day, Hour, and Hour.
- An input field for 'Hourly rainfall'.
- A checkbox labeled 'Continuous record entry' which is checked.
- A 'Save' button.
- A 'Refresh' button.
- A table with columns 'Date', 'Until_Date', and 'Hourly_Rainfall'.
- An 'Exit' button at the bottom right.

Five callout boxes provide the following instructions:

- 1) It checks it when continuously inputting it. (Points to the 'Continuous record entry' checkbox)
- 2) The date pulled for one hour from the time displayed in "Weather link" is input. (Points to the 'Hour' dropdown in the 'From (t-1)' section)
- 3) The time displayed in "Weather link" is input. (Points to the 'Hour' dropdown in the 'Until (t)' section)
- 4) The hourly rainfall is input. (Points to the 'Hourly rainfall' input field)
- 5) The button is clicked. (Points to the 'Save' button)

Please input consecutive time.

The 12hour half-value rainfall amount cannot be calculated when there are missing data.

The graph is not displayed for less than one week the input data.

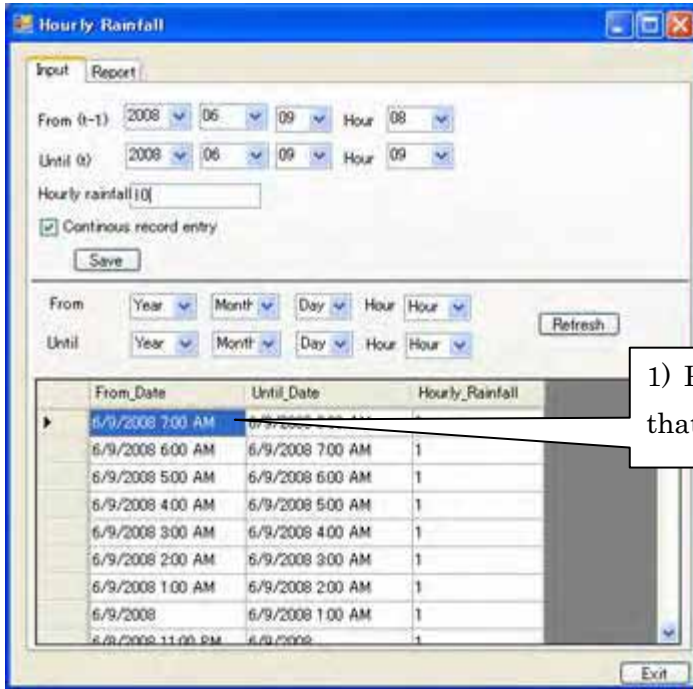
example) AM8 o'clock of the o'clock June 9, 2008 , 10mm of hourly rainfall is input.

The screen of "Weather link" is confirmed.

The screenshot shows the 'Hourly Rainfall' application window. The 'Input' tab is active. The 'From (t-1)' dropdowns are set to 2008, 06, 09, and Hour 08. The 'Until (t)' dropdowns are set to 2008, 06, 09, and Hour 09. The 'Hourly rainfall (t)' text box contains the value '10'. The 'Continuous record entry' checkbox is checked. A 'Save' button is visible. Below the input fields is a table with columns 'From Date', 'Until Date', and 'Hourly Rainfall'. The table shows data for various times on 6/9/2008, with the value '1' for most entries. Callouts point to the 'From (t-1)' Hour dropdown (2) '8 o'clock June 9, 2008' is input., the 'Until (t)' Hour dropdown (3) '9 o'clock June 9, 2008' is input., the 'Hourly rainfall (t)' text box (4) '10' is input, the 'Save' button (5) The button is clicked., and the table (1) It checks it when continuously inputting it.

The screenshot shows the 'Hourly Rainfall' application window after the 'Save' button was clicked. The 'From (t-1)' Hour dropdown is now set to 9, and the 'Until (t)' Hour dropdown is set to 10. The 'Hourly rainfall (t)' text box is empty. The 'Continuous record entry' checkbox is still checked. The 'Save' button is still visible. Below the input fields is a table with columns 'From Date', 'Until Date', and 'Hourly Rainfall'. The table shows data for various times on 6/9/2008, with the value '10' for the entry corresponding to the time interval 6/9/2008 8:00 AM to 6/9/2008 9:00 AM. Callouts point to the 'From (t-1)' Hour dropdown (6) It will change automatically in the next one hour. and the table (7) Please confirm the input data is displayed.

2.3. Change and Deletion of Hourly Rainfall Data



Hourly Rainfall

Input Report

From (t-1) 2008 06 09 Hour 08

Until (t) 2008 06 09 Hour 09

Hourly rainfall 10

Continuous record entry

Save

From Year Month Day Hour Hour

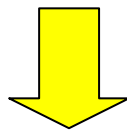
Until Year Month Day Hour Hour

Refresh

| From_Date | Until_Date | Hourly_Rainfall |
|-------------------|------------------|-----------------|
| 6/9/2008 7:00 AM | 6/9/2008 7:00 AM | 1 |
| 6/9/2008 6:00 AM | 6/9/2008 6:00 AM | 1 |
| 6/9/2008 5:00 AM | 6/9/2008 5:00 AM | 1 |
| 6/9/2008 4:00 AM | 6/9/2008 4:00 AM | 1 |
| 6/9/2008 3:00 AM | 6/9/2008 3:00 AM | 1 |
| 6/9/2008 2:00 AM | 6/9/2008 2:00 AM | 1 |
| 6/9/2008 1:00 AM | 6/9/2008 1:00 AM | 1 |
| 6/9/2008 | 6/9/2008 | 1 |
| 6/9/2008 11:00 PM | 6/9/2008 | 1 |

Exit

1) Please double-click the cell that changes or deletes it.



Edit Form

From (t-1) 08 2008 06 Hour 15

Until (t) 08 2008 06 Hour 16

Hourly rainfall

Delete Edit Cancel

2) The "Delete" button is clicked at the deletion.

2) The "Edit" button is clicked at the change of the value.

2.4. Calculation of Modified (12 hour Half-value) Rainfall Amount

The screenshot shows the 'Hourly Rainfall' software interface. It has two tabs: 'Input' and 'Report'. The 'Input' tab is active. The interface is divided into two main sections: 'Export to Graph' and 'View Records'. The 'Export to Graph' section has dropdown menus for 'Year', 'Month', 'Day', and 'Hour', a 'Hour half-value reduction' dropdown set to '---Select---', and a 'Computation period of 240' text box. Below these is an 'Export' button. The 'View Records' section has 'From' and 'Until' date pickers (Year, Month, Day, Hour), a 'Hour half-value reduction' dropdown set to '---Select---', and a 'Computation period of 240' text box. Below these are 'Calculate' and 'Export' buttons. A large greyed-out area is visible below the 'View Records' section. An 'Exit' button is at the bottom right.

1) Display first year time is input (At an arbitrary date).

2) The date when the hourly rain fall was input at the end is input.

3) Hour half-value is selected. ("12" is selected)

4) The calculation period is input. ("240" is input)

5) The button is clicked.

example) The numerical result from AM8 o'clock June 8, 2008 to AM8 o'clock June 9, 2008 is output.

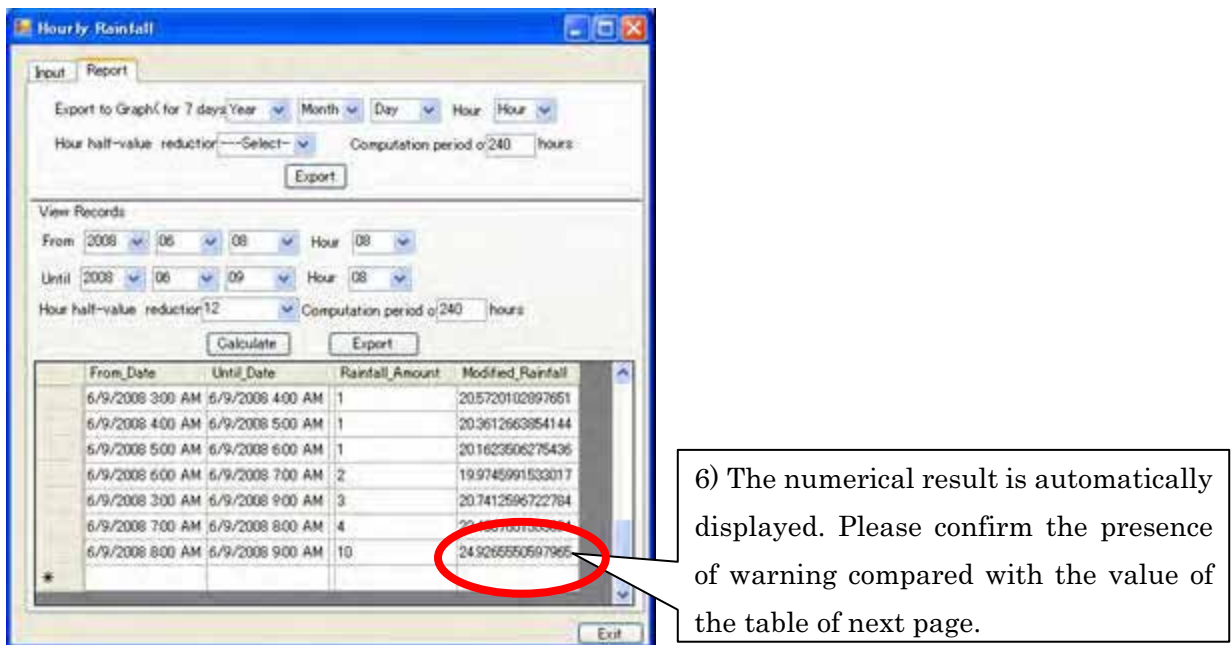
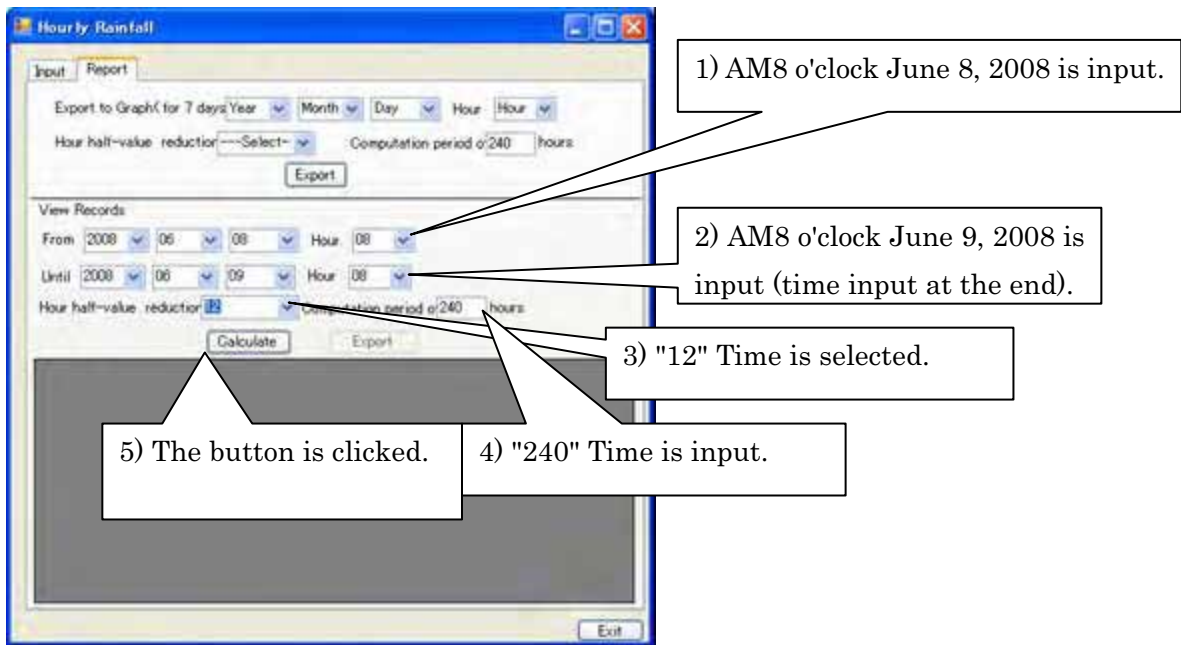


Table Threshold of Early Warning by Modified Rainfall Amount (Draft)

| Early Warning Level | Threshold of rainfall | Action | |
|---------------------|---|--|---|
| | | For road User | For Kabilash Villagers |
| Level IV | 12 hour half –value rainfall amount = 180mm Ten (10) year return period | Warning Notice: Recommendation to avoid traffic on the road | Warning Notice: Recommendation to evacuation on specific inhabitants of dangerous area until '12 hour half-value rainfall is under Level I |
| Level III | 12 hour half –value rainfall amount = 140mm Five (5) year return period | Caution Notice: Recommendation to careful passage on the | |
| Level II | 12 hour half –value rainfall amount = 80mm Two (2) year return period | Same as Level I | Caution Notice: Recommendation of preparation of evacuation of specific inhabitants of dangerous area. Recommendation of avoid transference in village (students wait home, or school) |
| Level I | 12 hour half-value rainfall amount = 60mm (One (1) year return period) | Care stance call up staff/workers/equipment for emergency action by division road office | Care stance Announce to Early Warning/Evacuation Team and word representatives |

2.5. Output of Graph of 12hour Half-Value Rainfall Amount

The screenshot shows the 'Hourly Rainfall' software interface. The window title is 'Hourly Rainfall'. It has two tabs: 'Input' and 'Report'. The 'Input' tab is active. The interface includes several dropdown menus for date selection (Year, Month, Day, Hour) and a text input field for 'Computation period of 240 hours'. There are two 'Export' buttons and one 'Calculate' button. A large grey rectangular area at the bottom is currently empty, representing the graph output. Four callout boxes with arrows point to specific elements: 1) points to the date selection dropdowns, 2) points to the 'Hour half-value reduction' dropdown menu, 3) points to the 'Computation period of 240 hours' text box, and 4) points to the 'Export' button.

1) The date when the hourly rain fall was input at the end is input.

2) Hour half-value is selected (12 hours are selected).

3) The calculation period is input (240 hours are input).

4) The button is clicked.

Example) The graph of AM8 o'clock June 9, 2008 is output.

The screenshot shows the 'Hourly Rainfall' application window. The 'Input' tab is active. The 'Export to Graph' section has dropdowns for year (2008), month (06), and day (09), and a 'Hour' dropdown set to 08. Below this, 'Hour half-value reduction' is set to 12 and 'Computation period' is set to 240 hours. An 'Export' button is highlighted. The 'View Records' section shows 'From' (2008/06/08) and 'Until' (2008/06/09) dates, with 'Hour half-value reduction' set to 12 and 'Computation period' set to 240 hours. A table below displays rainfall data for June 9, 2008, from 2:00 AM to 9:00 AM.

| From_Date | Until_Date | Rainfall_Amount | Modified_Rainfall |
|------------------|------------------|-----------------|-------------------|
| 6/9/2008 2:00 AM | 6/9/2008 3:00 AM | 1 | 20.5720102897651 |
| 6/9/2008 3:00 AM | 6/9/2008 4:00 AM | 1 | 20.3612663854144 |
| 6/9/2008 4:00 AM | 6/9/2008 5:00 AM | 1 | 20.1623506275436 |
| 6/9/2008 5:00 AM | 6/9/2008 6:00 AM | 2 | 19.9745991533017 |
| 6/9/2008 6:00 AM | 6/9/2008 7:00 AM | 3 | 20.7412596722784 |
| 6/9/2008 7:00 AM | 6/9/2008 8:00 AM | 4 | 22.4087651553694 |
| 6/9/2008 8:00 AM | 6/9/2008 9:00 AM | 10 | 24.9265550597965 |

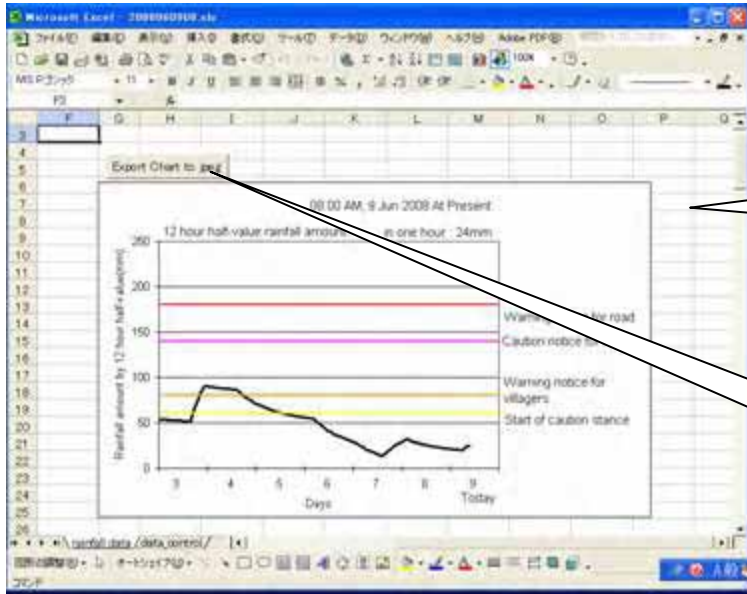
Callouts in the image:

- 1) "AM8 o'clock June 9, 2008" is input.
- 2) For "12" hours is selected.
- 3) For "240" hours is input
- 4) The button is clicked.

The screenshot shows a 'Save File As' dialog box. The 'Save in' field shows the 'data' folder is selected. The 'File name' field contains '2008060908.xls'. The 'File type' is set to 'Excel files (*.xls)'. The 'Save' button is highlighted.

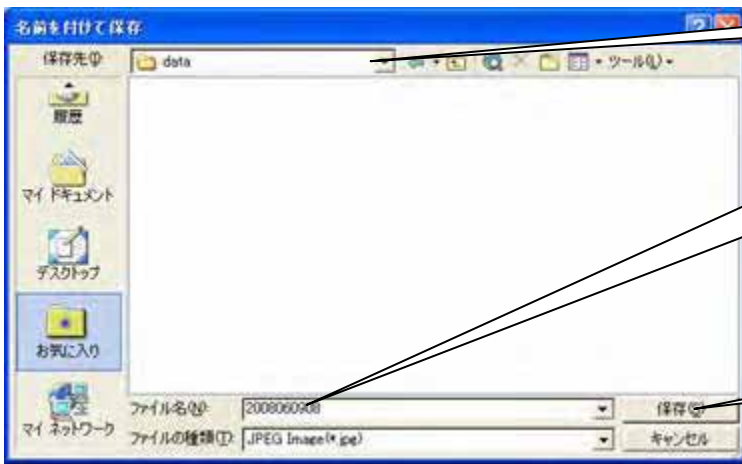
Callouts in the image:

- 4) The save folder is selected.
- 5) The file name is input
- 6) The button is clicked.



7) Automatic graph making

8) The button is clicked



9) The save folder is selected.

10) The file name is input

11) The button is clicked



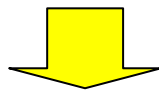
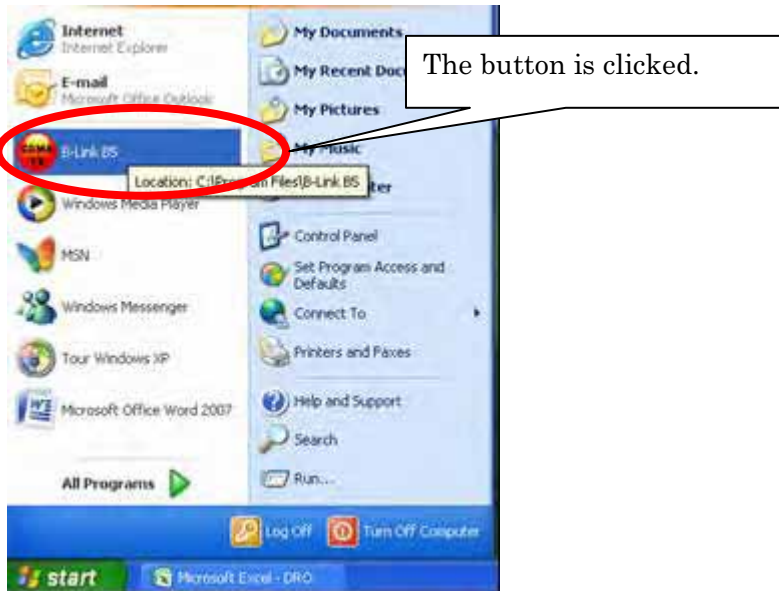
12) Confirmation of graph picture file

13) This file is up-loaded to the Web page.

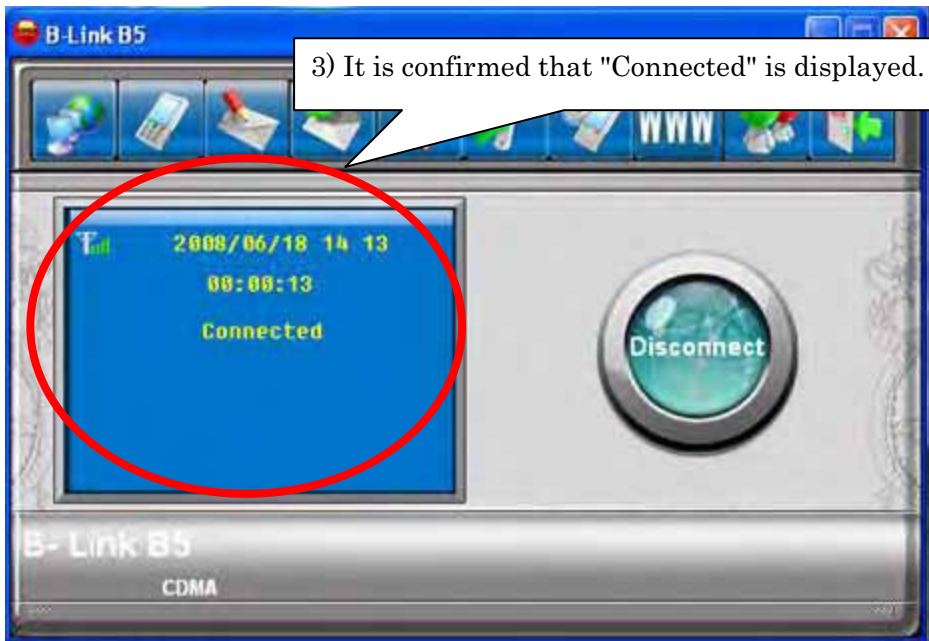
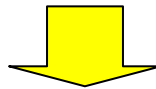
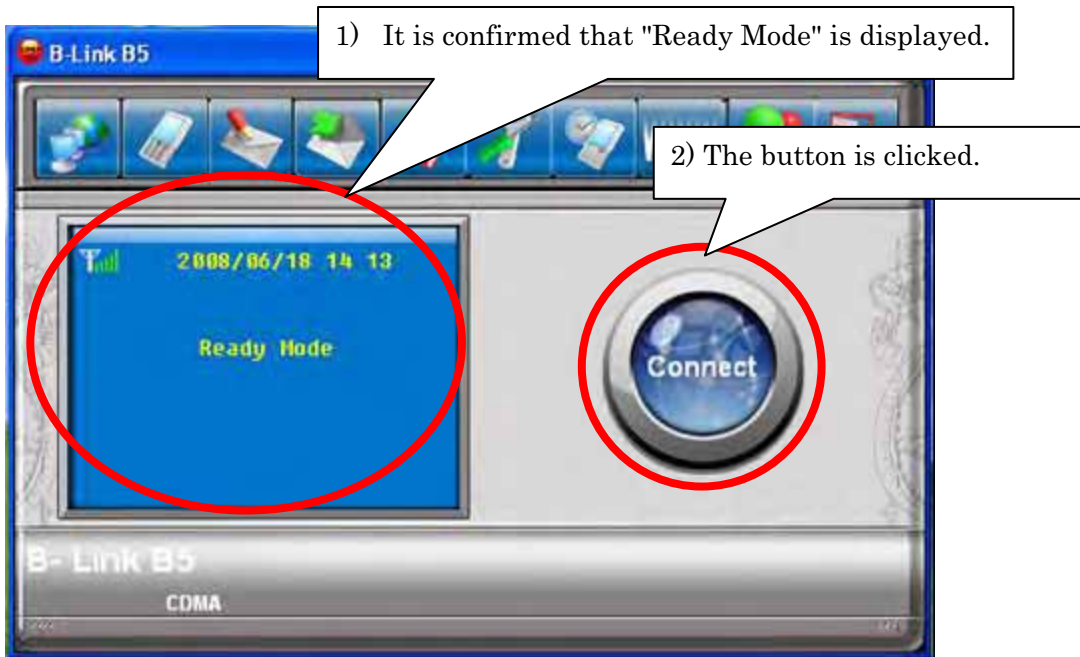
3. The Internet connection ("B-Link")

3.1. Start of software

Software "B-Link" is started.



3.2. The Internet Connection




Please do "Disconnect" after the up-loading of the file ends.


The charge is generated in the Internet connection. Because it connects it with CDMA of the prepaid type

4. Up-loading of Graph Picture file to Web page ("Internet Explorer")

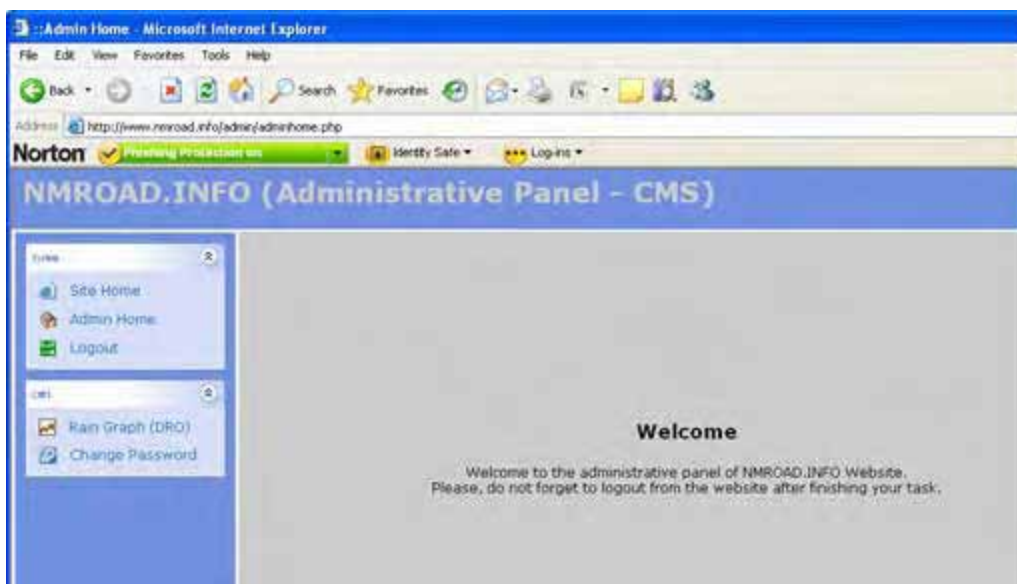
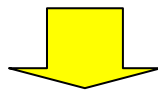
4.1. Login



1) Please input URL "http://www.nmroad.info/admin" (The input of URL becomes unnecessary if it registers in "Favorites" once).



2) "dro" is input to Username.
3) "dro321" is input to Password
4) "Login" button is clicked.



Admin Home - Microsoft Internet Explorer

Address: http://www.nmroad.info/admin/adminhome.php

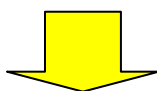
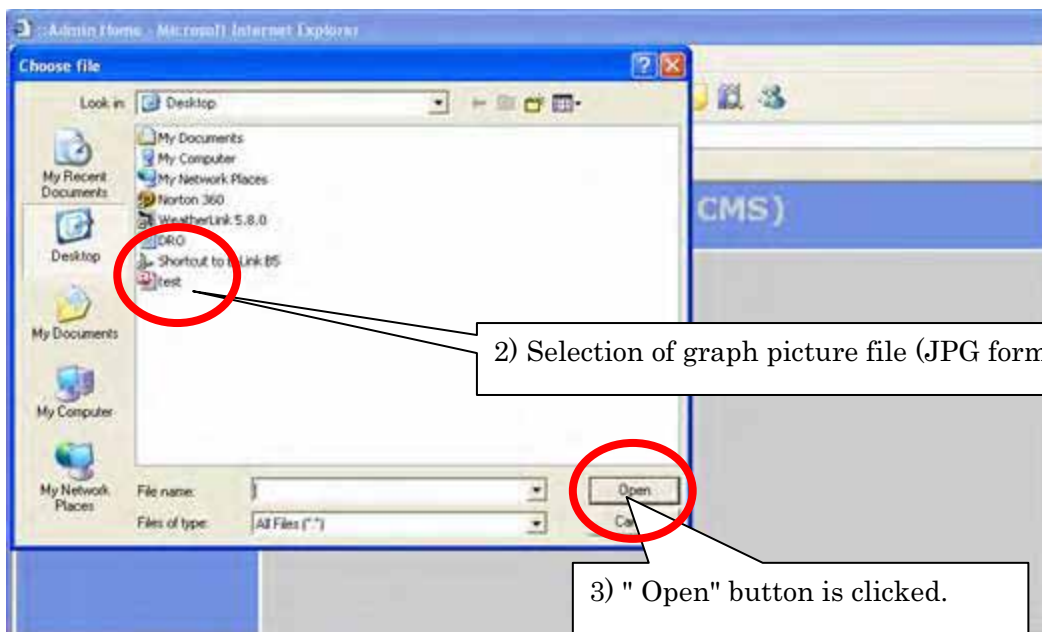
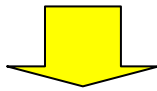
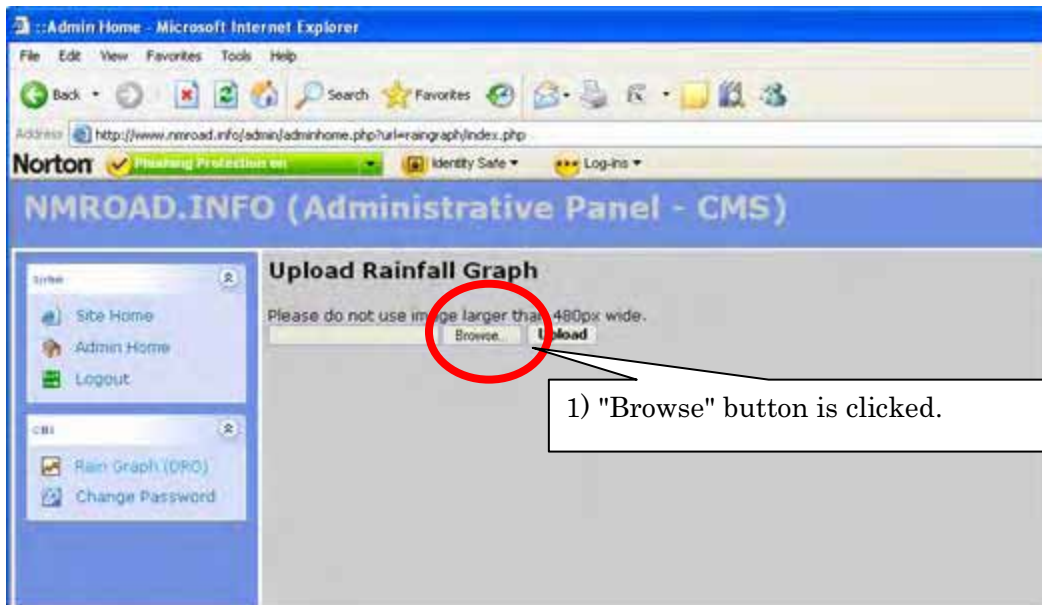
NMROAD.INFO (Administrative Panel - CMS)

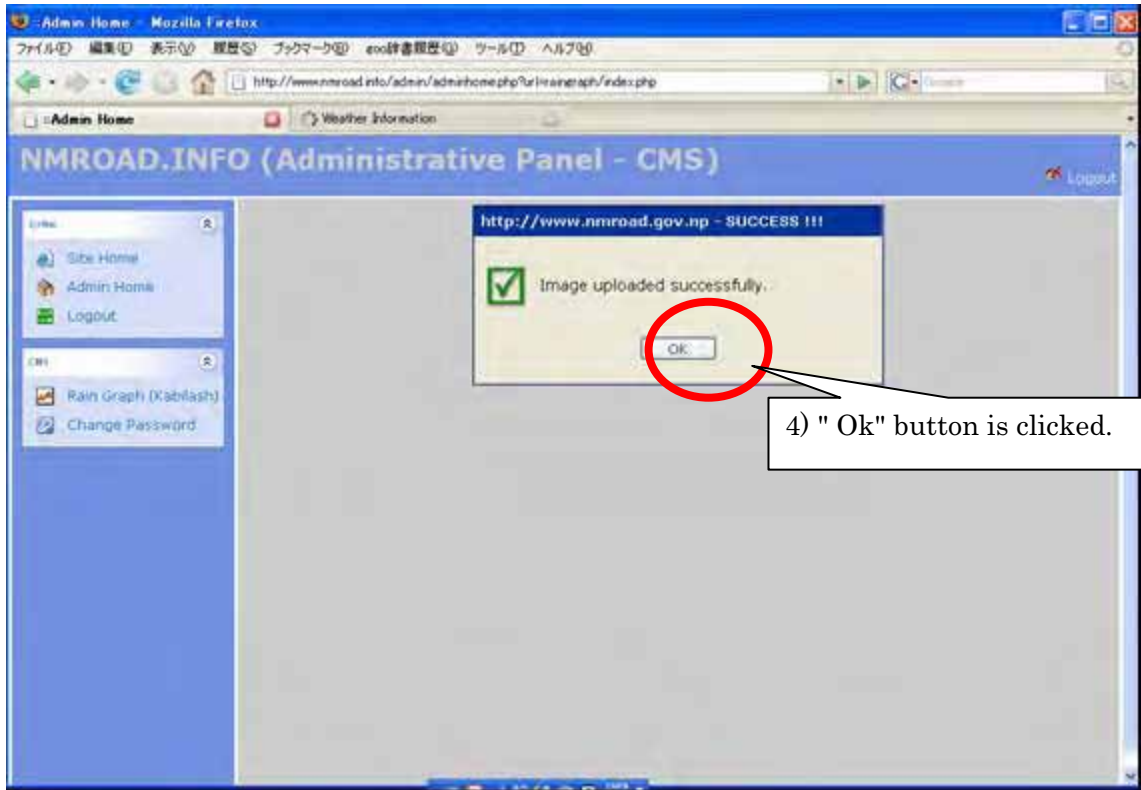
Site Home
Admin Home
Logout
Rain Graph (DRO)
Change Password

Welcome

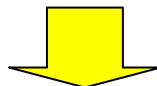
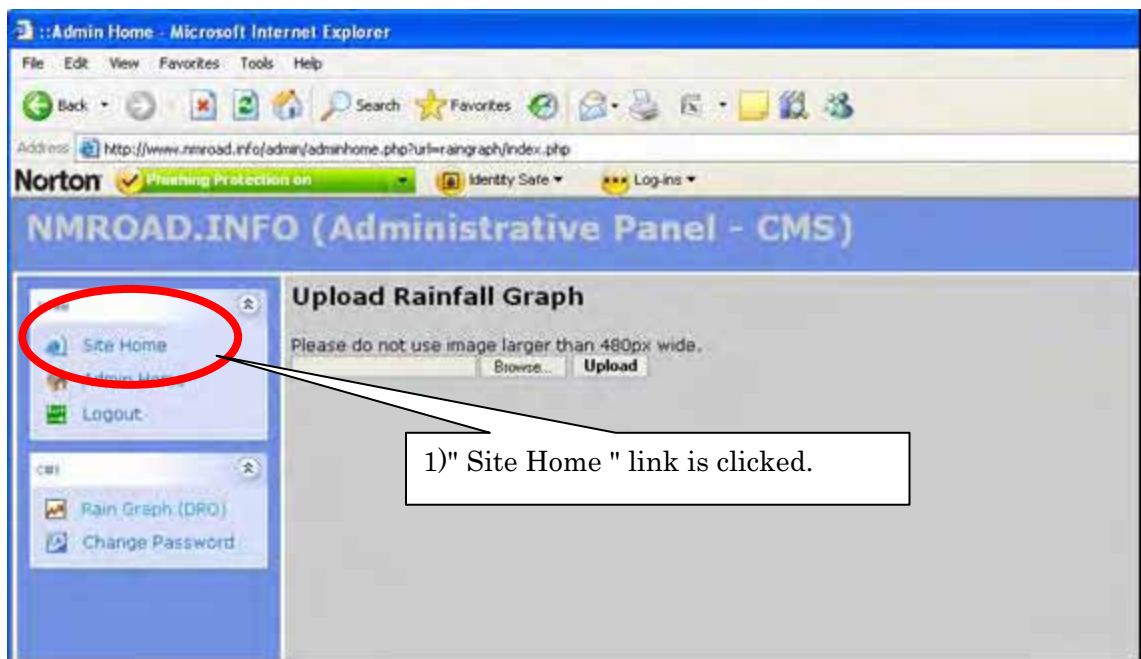
Welcome to the administrative panel of NMROAD.INFO Website.
Please, do not forget to logout from the website after finishing your task.

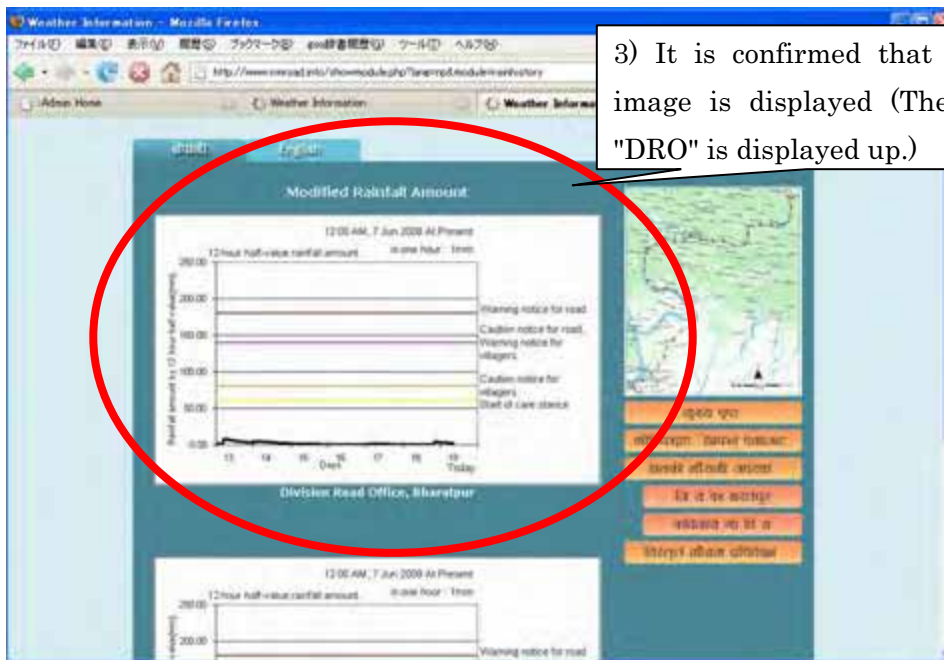
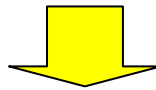
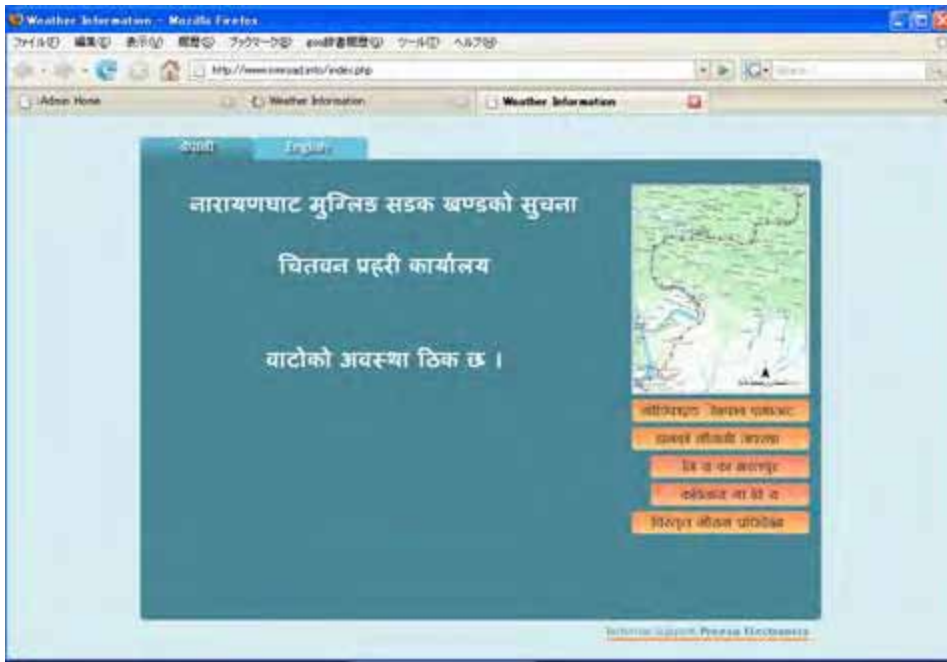
4.2. Up-loading of picture file





4.3. Confirmation of Registered Picture File





3) It is confirmed that the graph image is displayed (The graph of "DRO" is displayed up.)

Appendix-3

Narayangharh-Mugling (N-M) Highway

Road Early Information System Appreciation Manual

(for Kabilash VDC)

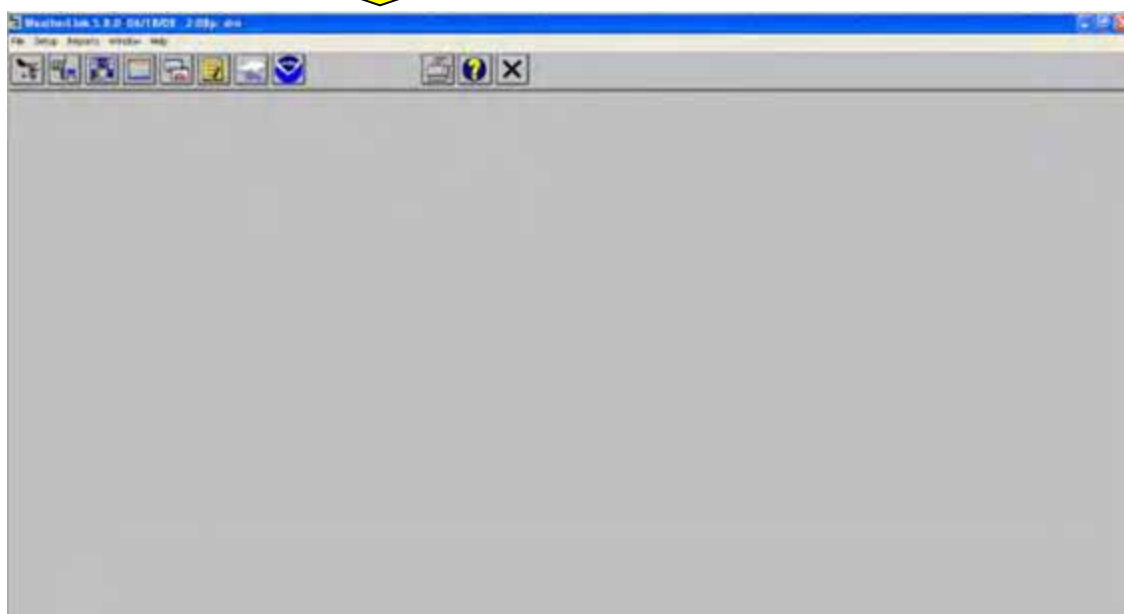
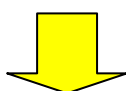
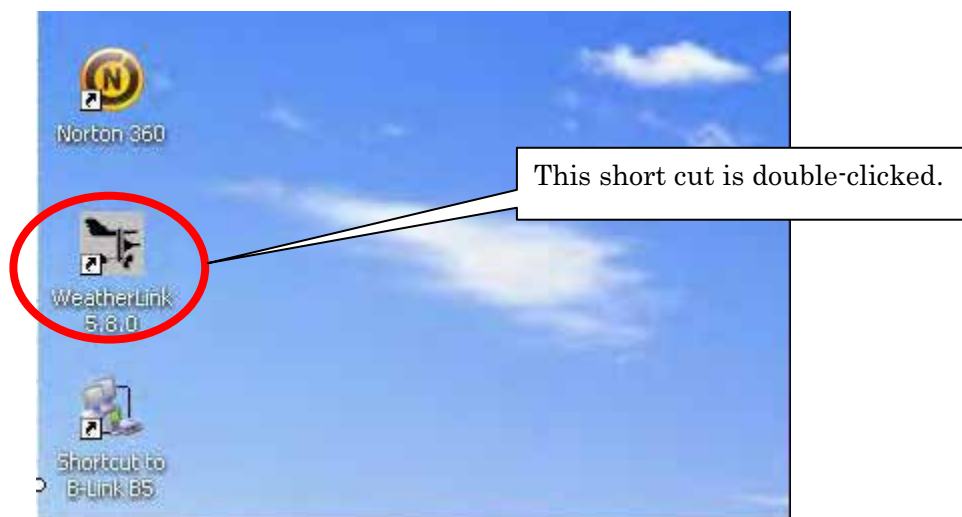
Contents

- 1. Display of hourly rainfall ("Weather Link")**
- 2. Calculation of 12 hour half -value rainfall amount and making of graph picture file ("Hourly Rainfall")**
- 3. The Internet connection ("B-Link")**
- 4. Up-loading of graph picture file to Web page ("Internet Explore")**

1. Display of Hourly Rainfall ("Weather Link")

1.1. Starting-up of Software

The software "Weather Link" is started.

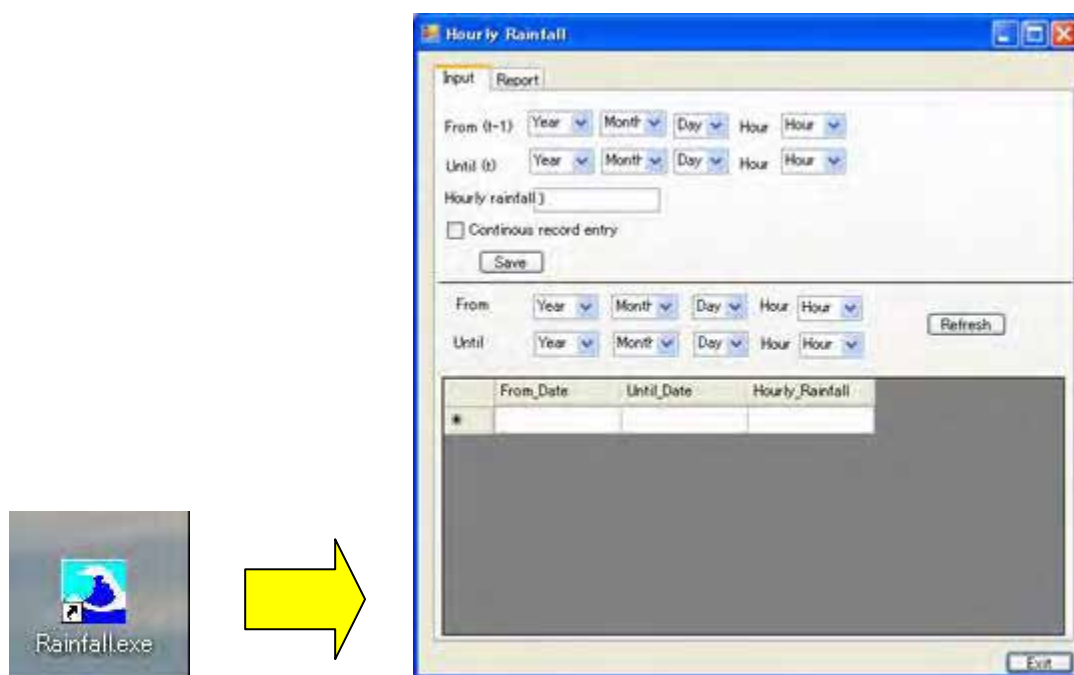


2. Calculation of 12 Hour Half - value Rainfall Amount and Making of Graph Picture File ("Hourly Rainfall")

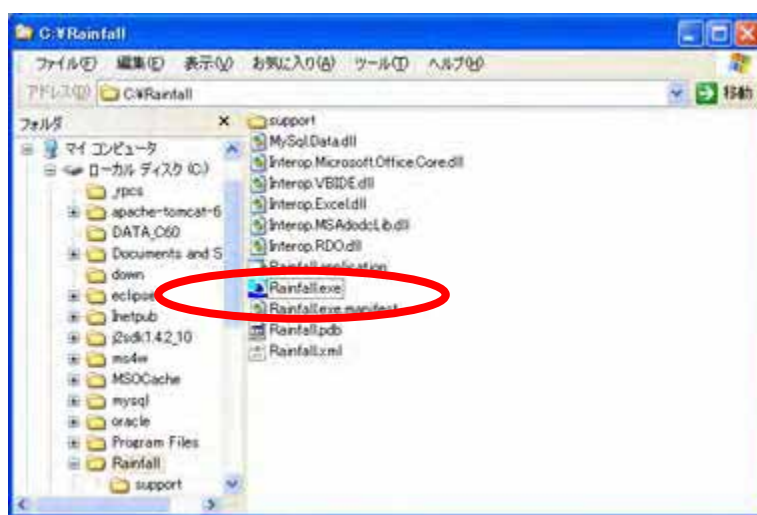
2.1. Starting-up of Software

The software "Hourly Rainfall" is started. This software is started as follows.

The "Rainfall.exe" short cut in the desktop is double-clicked.



Please double-click "Rainfall.exe" in the "Rainfall" folder in the C drive when you can not find the short cut in your desktop.



2.2. Input of Hourly Rainfall

The screenshot shows the 'Hourly Rainfall' software interface. It has two tabs: 'Input' and 'Report'. The 'Input' tab is active. The interface includes the following elements:

- 'From (t-1)' and 'Until (t)' sections, each with dropdown menus for Year, Month, Day, Hour, and Hour.
- A text input field for 'Hourly rainfall'.
- A checkbox labeled 'Continuous record entry' which is checked.
- A 'Save' button.
- A 'Refresh' button.
- A table with columns 'Date', 'Until_Date', and 'Hourly_Rainfall'.
- An 'Exit' button at the bottom right.

Five callout boxes provide instructions:

- 1) Check the box incase continuous record entry.
- 2) The date, which subtract 1hour from the time displayed in "Weather link", is input.
- 3) The time displayed in "Weather link" is input.
- 4) The hourly rainfall is input.
- 5) The button is clicked.

It is necessary to input consecutive time in this system, or the 12hour half-value rainfall amount cannot be calculated.

The graph is not displayed incase that the input data is less than 1 week.

Example) AM8:00, June 9, 2008 , the hourly rainfall is 10mm.

You can see the screen of "Weather link".

2) "AM8:00, June 9, 2008" is input.

3) "9 o'clock June 9, 2008" is input.

4) "10" is input

5) The button is clicked.

1) Check the box incase continuous record entry.

| From Date | Until Date | Hourly_Rainfall |
|------------------|------------------|-----------------|
| 6/9/2008 8:00 AM | 6/9/2008 8:00 AM | 1 |
| 6/9/2008 7:00 AM | 6/9/2008 7:00 AM | 1 |
| 6/9/2008 6:00 AM | 6/9/2008 6:00 AM | 1 |
| 6/9/2008 5:00 AM | 6/9/2008 5:00 AM | 1 |
| 6/9/2008 4:00 AM | 6/9/2008 4:00 AM | 1 |
| 6/9/2008 3:00 AM | 6/9/2008 3:00 AM | 1 |
| 6/9/2008 2:00 AM | 6/9/2008 2:00 AM | 1 |

6) The value will be changed automatically to the next one hour.

7) You should confirm the display of input data.

| From Date | Until Date | Hourly_Rainfall |
|------------------|------------------|-----------------|
| 6/9/2008 8:00 AM | 6/9/2008 9:00 AM | 10 |
| 6/9/2008 7:00 AM | 6/9/2008 8:00 AM | 1 |
| 6/9/2008 6:00 AM | 6/9/2008 7:00 AM | 1 |
| 6/9/2008 5:00 AM | 6/9/2008 6:00 AM | 1 |
| 6/9/2008 4:00 AM | 6/9/2008 5:00 AM | 1 |
| 6/9/2008 3:00 AM | 6/9/2008 4:00 AM | 1 |
| 6/9/2008 2:00 AM | 6/9/2008 3:00 AM | 1 |
| 6/9/2008 1:00 AM | 6/9/2008 2:00 AM | 1 |
| 6/9/2008 | 6/9/2008 1:00 AM | 1 |

2.3. Change and Deletion of Hourly Rainfall Data

Hourly Rainfall

Input Report

From (t-1) 2008 06 09 Hour 08

Until (t) 2008 06 09 Hour 09

Hourly rainfall 10

Continuous record entry

Save

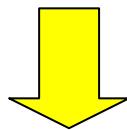
From Year Month Day Hour Hour

Until Year Month Day Hour Hour

Refresh

| From_Date | Until_Date | Hourly_Rainfall |
|-------------------|------------------|-----------------|
| 6/9/2008 7:00 AM | 6/9/2008 7:00 AM | 1 |
| 6/9/2008 6:00 AM | 6/9/2008 6:00 AM | 1 |
| 6/9/2008 5:00 AM | 6/9/2008 5:00 AM | 1 |
| 6/9/2008 4:00 AM | 6/9/2008 4:00 AM | 1 |
| 6/9/2008 3:00 AM | 6/9/2008 3:00 AM | 1 |
| 6/9/2008 2:00 AM | 6/9/2008 2:00 AM | 1 |
| 6/9/2008 1:00 AM | 6/9/2008 1:00 AM | 1 |
| 6/9/2008 | 6/9/2008 | 1 |
| 6/9/2008 11:00 PM | 6/9/2008 | 1 |

Exit



Edit Form

From (t-1) 08 2008 06 Hour 15

Until (t) 08 2008 06 Hour 16

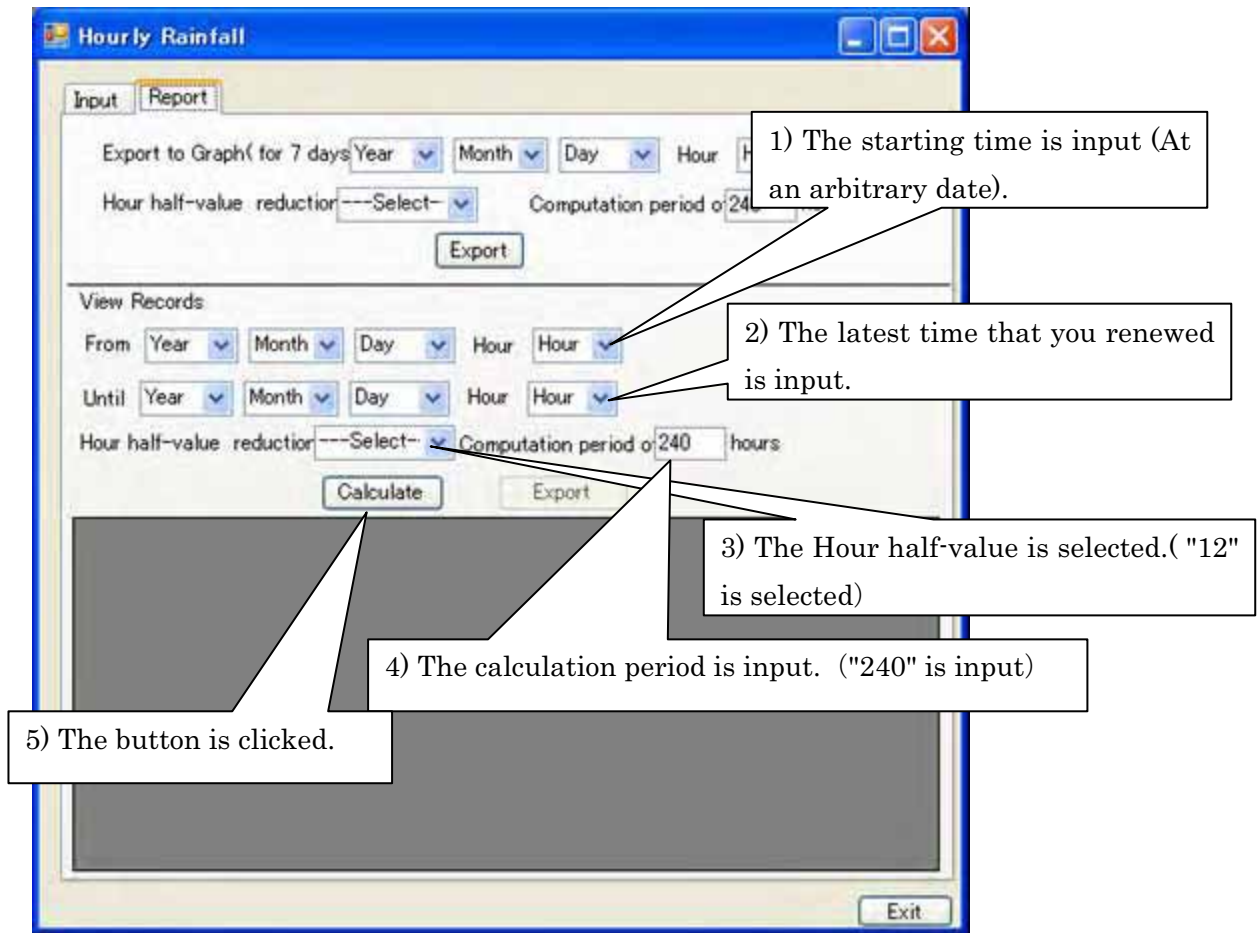
Hourly rainfall

Delete Edit Cancel

2) The "Delete" button is clicked when you delete the value.

2) The "Edit" button is clicked when you change the value.

2.4. Calculation of Modified (12 hour half-value) Rainfall Amount



Example) The numerical result from AM8 o'clock June 8, 2008 to AM8 o'clock June 9, 2008 is output.

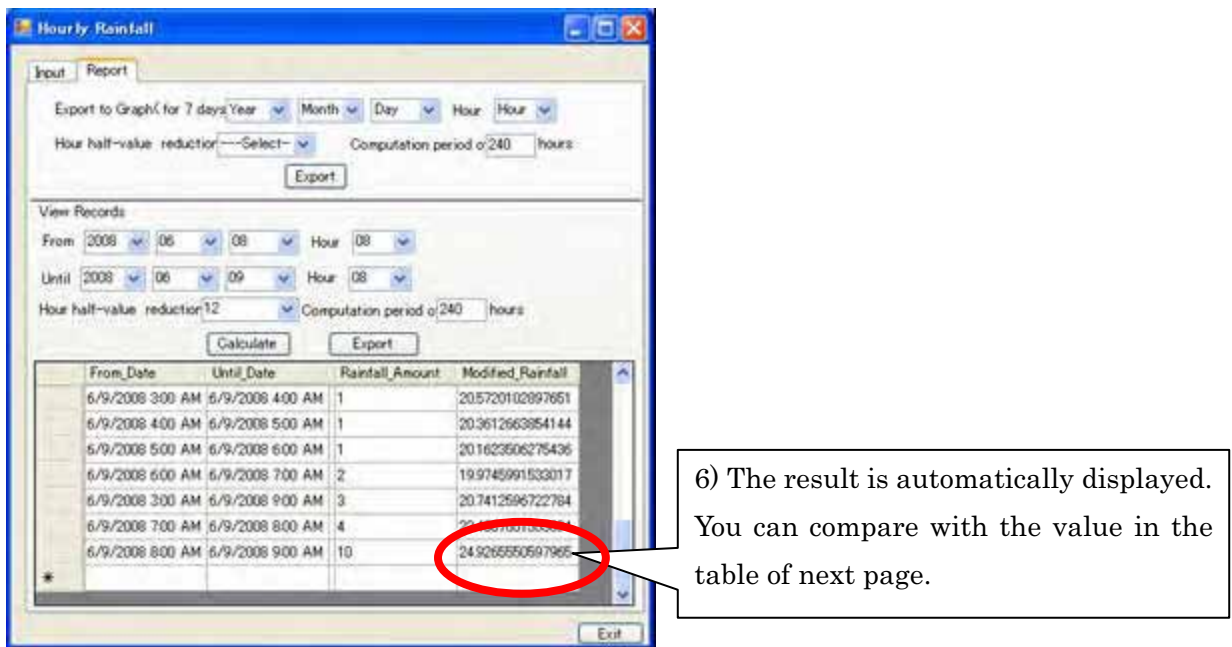
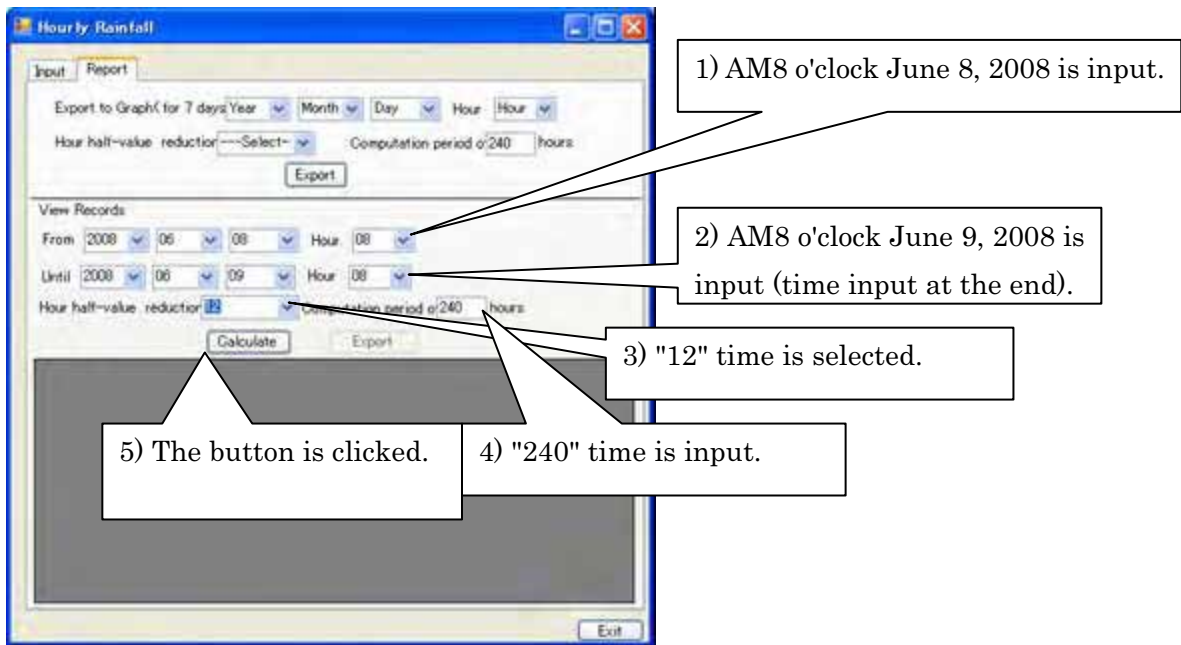


Table Threshold of Early Warning by Modified Rainfall Amount

| Early Warning Level | Threshold of rainfall | Action | |
|---------------------|---|--|---|
| | | For road User | For Kabilash Villagers |
| Level IV | 12 hour half –value rainfall amount = 180mm Ten (10) year return period | Warning Notice: Recommendation to avoid traffic on the road | Warning Notice: Recommendation to evacuation on specific inhabitants of dangerous area until '12 hour half-value rainfall is under Level I |
| Level III | 12 hour half –value rainfall amount = 140mm Five (5) year return period | Caution Notice: Recommendation to careful passage on the | |
| Level II | 12 hour half –value rainfall amount = 80mm Two (2) year return period | Same as Level I | Caution Notice: Recommendation of preparation of evacuation of specific inhabitants of dangerous area. Recommendation of avoid transference in Village (students wait home, or school) |
| Level I | 12 hour half-value rainfall amount = 60mm (One (1) year return period) | Care stance call up staff/workers/equipment for emergency action by division road office | Care stance Announce to Early Warning/Evacuation Team and word representatives |

2.5. Output of Graph of 12hour Half-value Rainfall Amount

The screenshot shows the 'Hourly Rainfall' software interface. It has two tabs: 'Input' and 'Report'. The 'Input' tab is active. The interface includes several dropdown menus for 'Year', 'Month', 'Day', and 'Hour' under the heading 'Export to Graph(for 7 days'. Below this, there is a 'Hour half-value reduction' dropdown menu set to '---Select---' and a 'Computation period of 240 hours' text box. An 'Export' button is located below these controls. The 'View Records' section has similar dropdown menus for 'From' and 'Until' dates, and another 'Hour half-value reduction' dropdown set to '---Select---' and a 'Computation period of 240' text box. A 'Calculate' button is below this section. A large grey rectangular area is at the bottom of the window, and an 'Exit' button is in the bottom right corner. Four callout boxes with arrows point to specific elements: 1) points to the date dropdowns, 2) points to the 'Hour half-value reduction' dropdown, 3) points to the 'Computation period of 240' text box, and 4) points to the 'Export' button.

1) The date when the hourly rain fall was input at the end is input.

2) Hour half-value is selected (12 hours are selected).

3) The calculation period is input (240 hours are input).

4) The button is clicked.

Example) The graph of AM8 o'clock June 9, 2008 is output.

The screenshot shows the 'Hourly Rainfall' application window. It has two tabs: 'Input' and 'Report'. The 'Input' tab is active. The 'Export to Graph' section has dropdown menus for 'for 7 days' (2008), '06', '09', and 'Hour' (08). Below this, there are checkboxes for 'Hour half-value reduction' and a text box for 'Computation period of 240' hours. An 'Export' button is located below these options. The 'View Records' section has similar dropdowns for 'From' (2008, 06, 08) and 'Until' (2008, 06, 09), and a 'Computation period of 240' hours. Below this is a table with columns: 'From_Date', 'Until_Date', 'Rainfall_Amount', and 'Modified_Rainfall'. The table contains 7 rows of data for the date 6/9/2008, starting from 2:00 AM to 9:00 AM. An 'Exit' button is at the bottom right.

1) "AM8:00, June 9, 2008" is input.

2) "12" hour is selected.

3) "240" hours is input

4) The button is clicked.

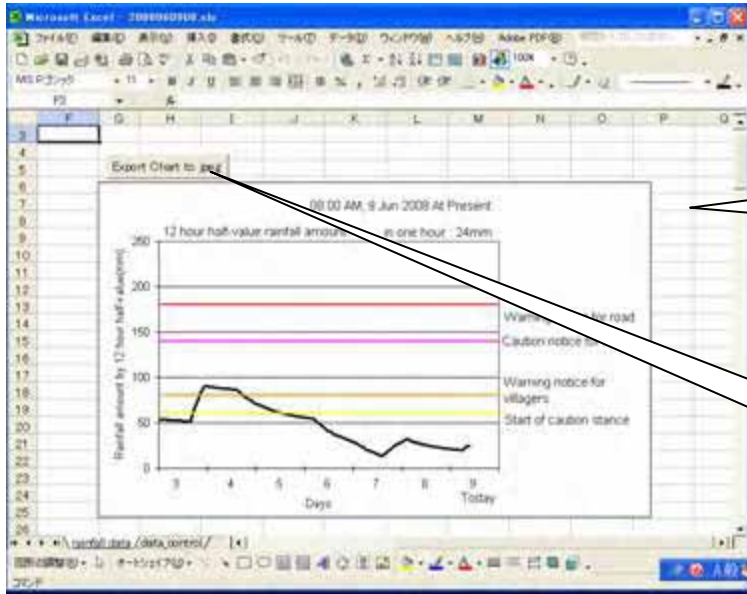
| From_Date | Until_Date | Rainfall_Amount | Modified_Rainfall |
|------------------|------------------|-----------------|-------------------|
| 6/9/2008 2:00 AM | 6/9/2008 3:00 AM | 1 | 20.5720102897651 |
| 6/9/2008 3:00 AM | 6/9/2008 4:00 AM | 1 | 20.3612663854144 |
| 6/9/2008 4:00 AM | 6/9/2008 5:00 AM | 1 | 20.1623506275436 |
| 6/9/2008 5:00 AM | 6/9/2008 6:00 AM | 2 | 19.9745991533017 |
| 6/9/2008 6:00 AM | 6/9/2008 7:00 AM | 3 | 20.7412596722784 |
| 6/9/2008 7:00 AM | 6/9/2008 8:00 AM | 4 | 22.4087651553694 |
| 6/9/2008 8:00 AM | 6/9/2008 9:00 AM | 10 | 24.9265550597965 |

The screenshot shows a 'Save File As' dialog box. The 'Save in' field shows 'data'. The file name field contains '2008060908.xls'. The file type is set to 'Excel files (*.xls)'. There are '保存' (Save) and 'キャンセル' (Cancel) buttons at the bottom right.

5) The saved folder is selected.

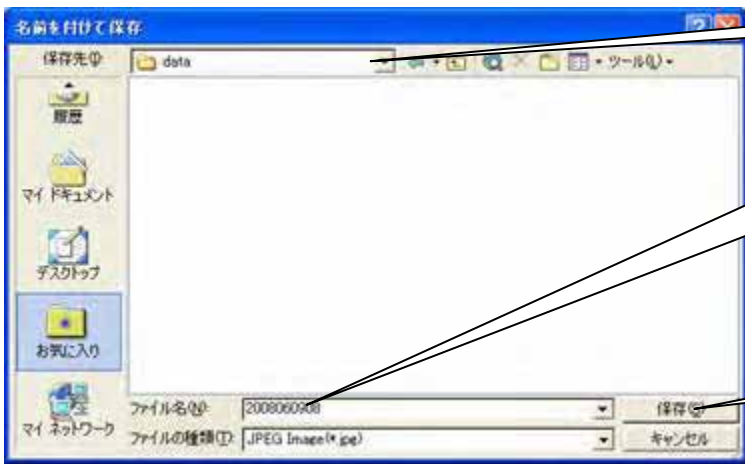
6) The file name is input

7) The button is clicked.



7) Automatic graph making

8) The button is clicked



9) The save folder is selected.

10) The file name is input

11) The button is clicked



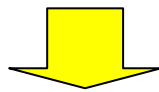
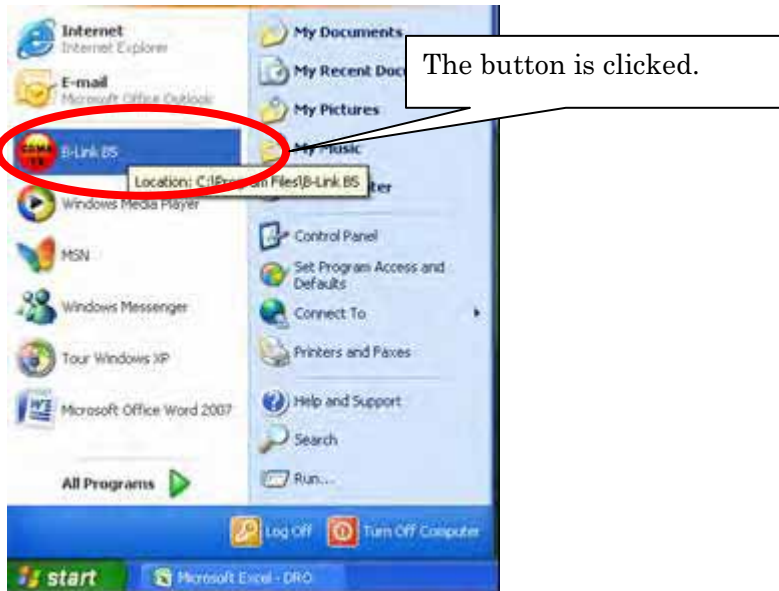
12) Confirmation of graph picture file

13) This file is up-loaded to the Web page.

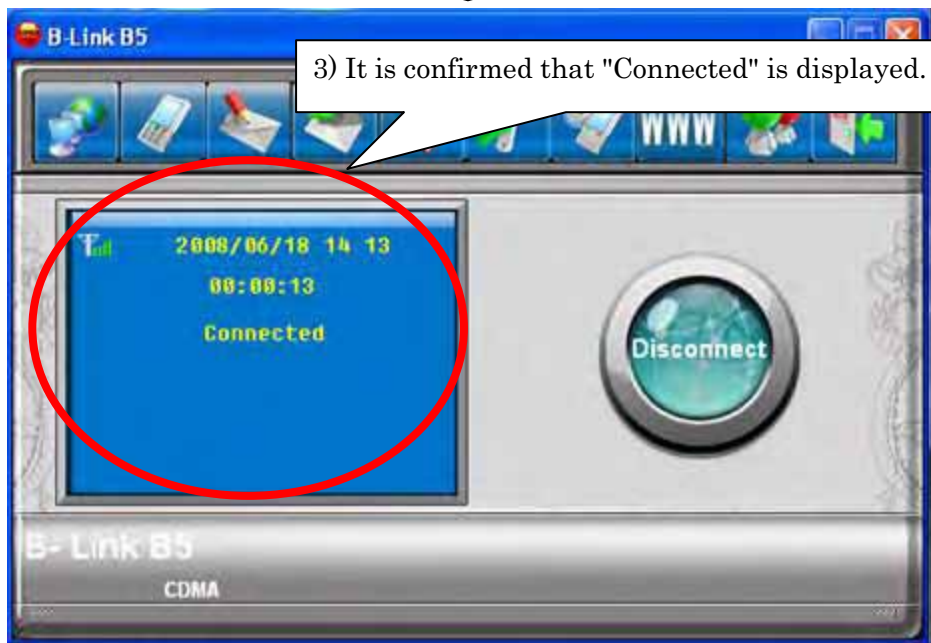
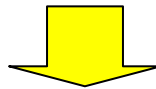
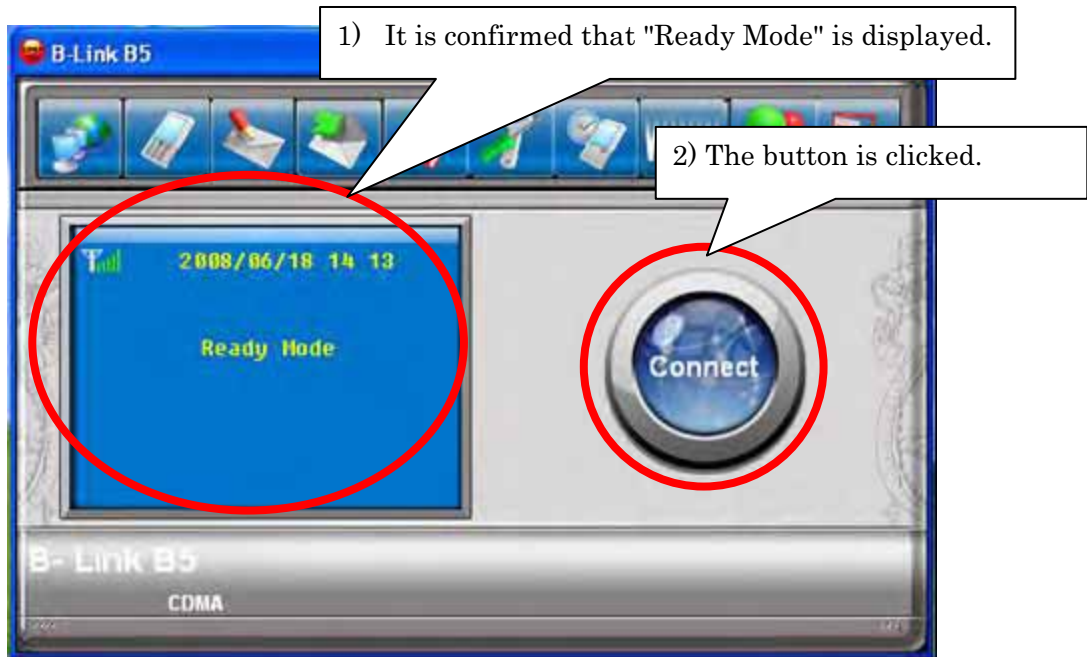
3. The Internet Connection ("B-Link")

3.1. Starting-up of Software

Software "B-Link" is started.



3.2. The Internet connection




Please do "Disconnect" after the up-loading of the file ends.

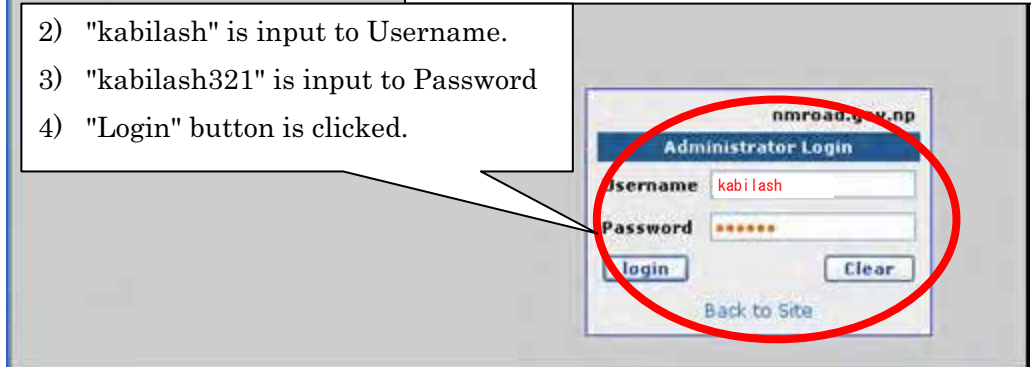
The charge is generated in the Internet connection. Because it connects it with CDMA of the prepaid type

4. Up-loading of graph picture file to Web page ("Internet Explorer")

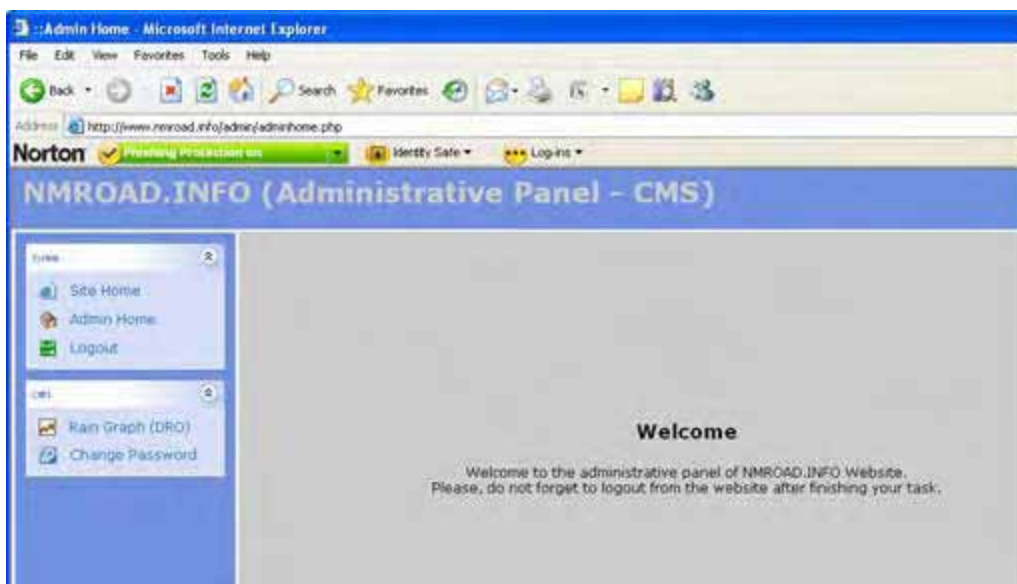
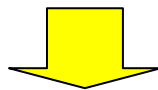
4.1. Login



1) Please input URL "http://www.nmroad.info/admin" (The input of URL becomes unnecessary if it registers in "Favorites" once).



2) "kabilash" is input to Username.
3) "kabilash321" is input to Password
4) "Login" button is clicked.



Admin Home - Microsoft Internet Explorer

Address: http://www.nmroad.info/admin/adminhome.php

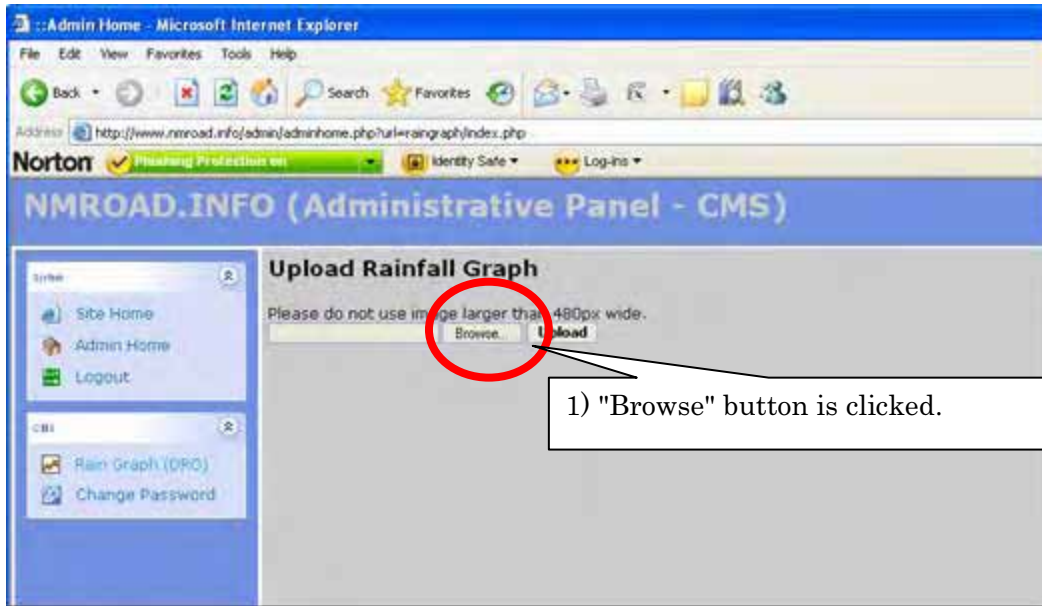
NMROAD.INFO (Administrative Panel - CMS)

Site Home
Admin Home
Logout
Rain Graph (DRO)
Change Password

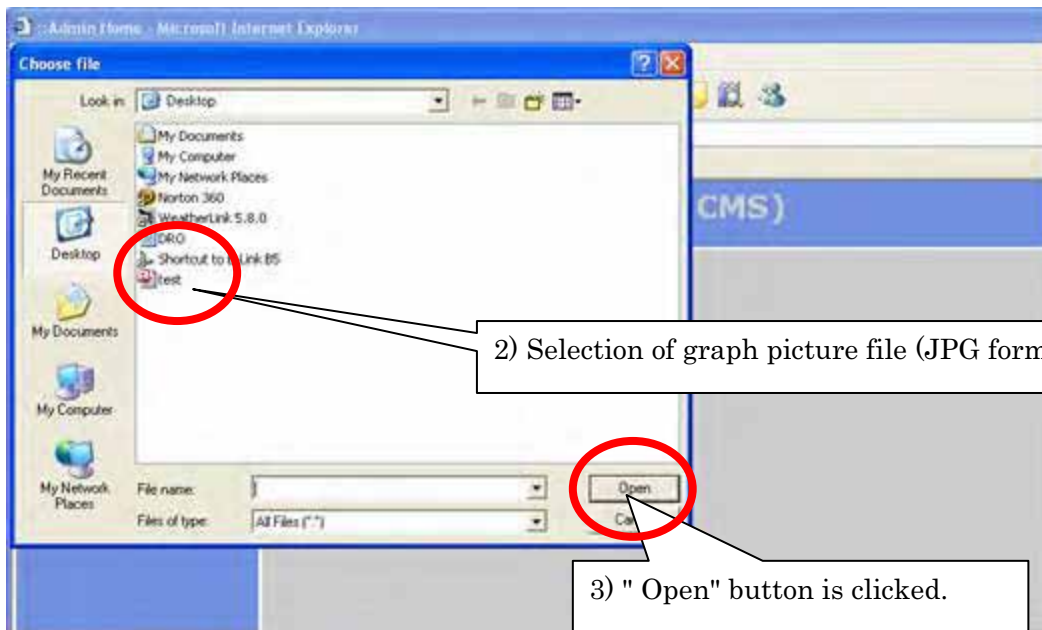
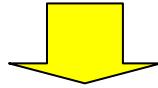
Welcome

Welcome to the administrative panel of NMROAD.INFO Website.
Please, do not forget to logout from the website after finishing your task.

4.2. Up-loading of Picture File

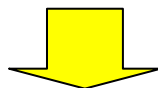


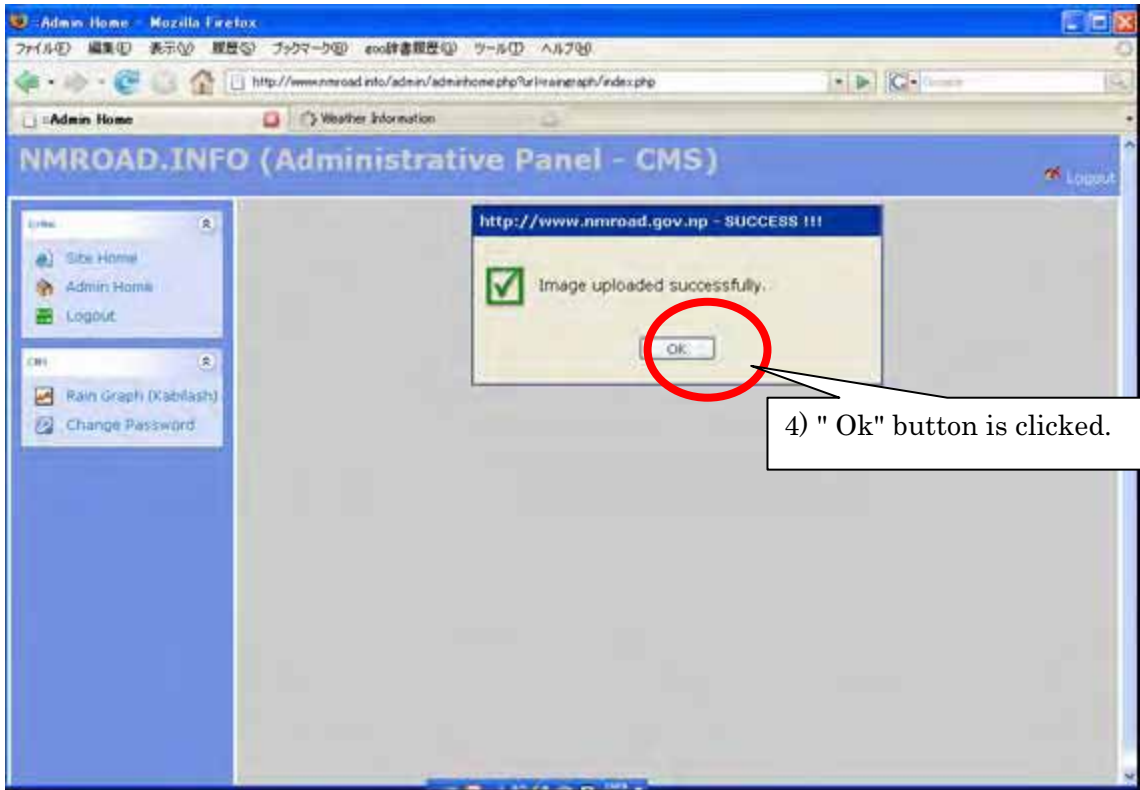
1) "Browse" button is clicked.



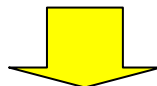
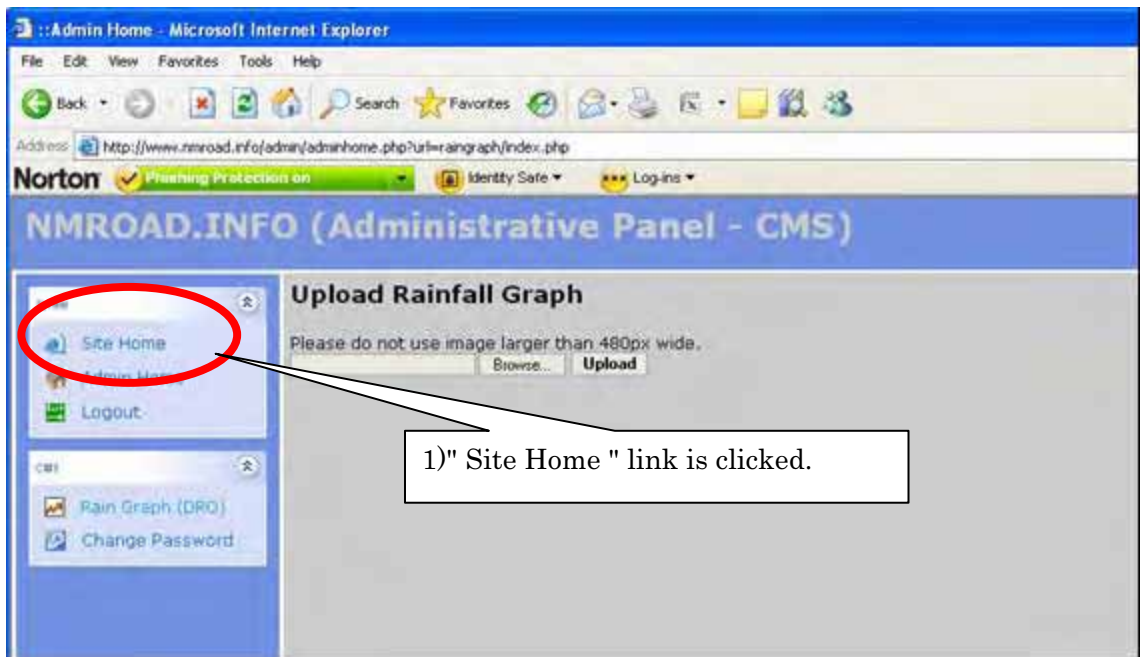
2) Selection of graph picture file (JPG form)

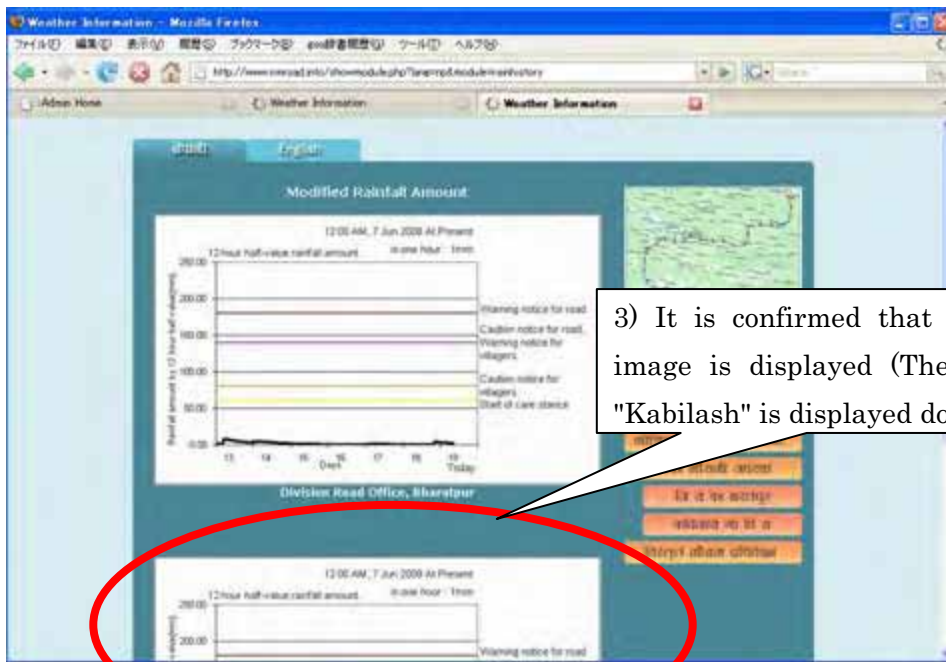
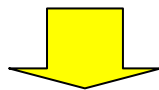
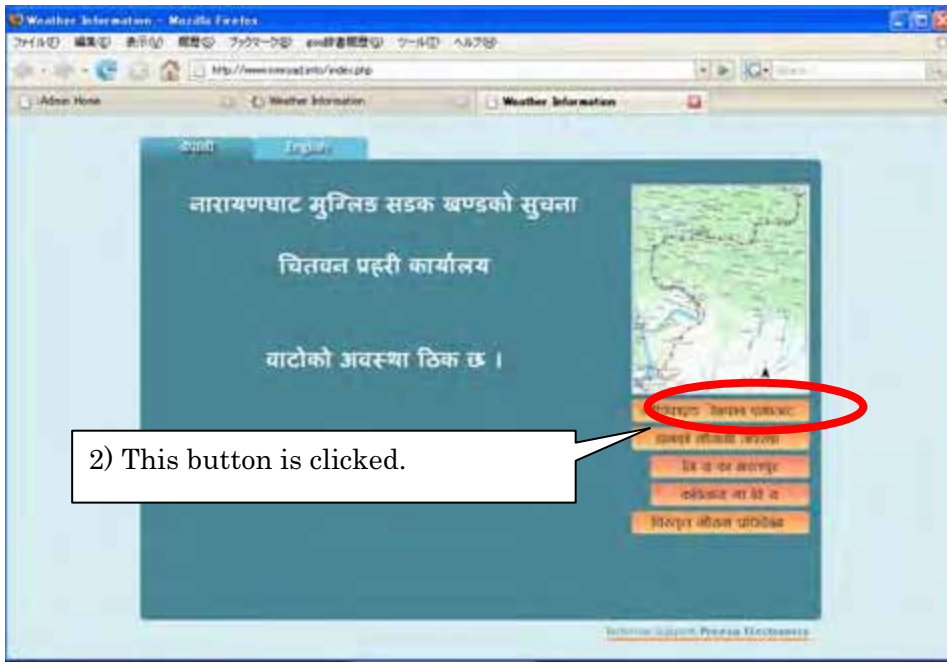
3) " Open" button is clicked.





4.3. Confirmation of Registered Picture File





XI

HAZARD MAPS

- 1. Satellite image**
- 2. Topographic map**



Figure XI-1-1 Kabilash Village Hazard Map Ward NO.1

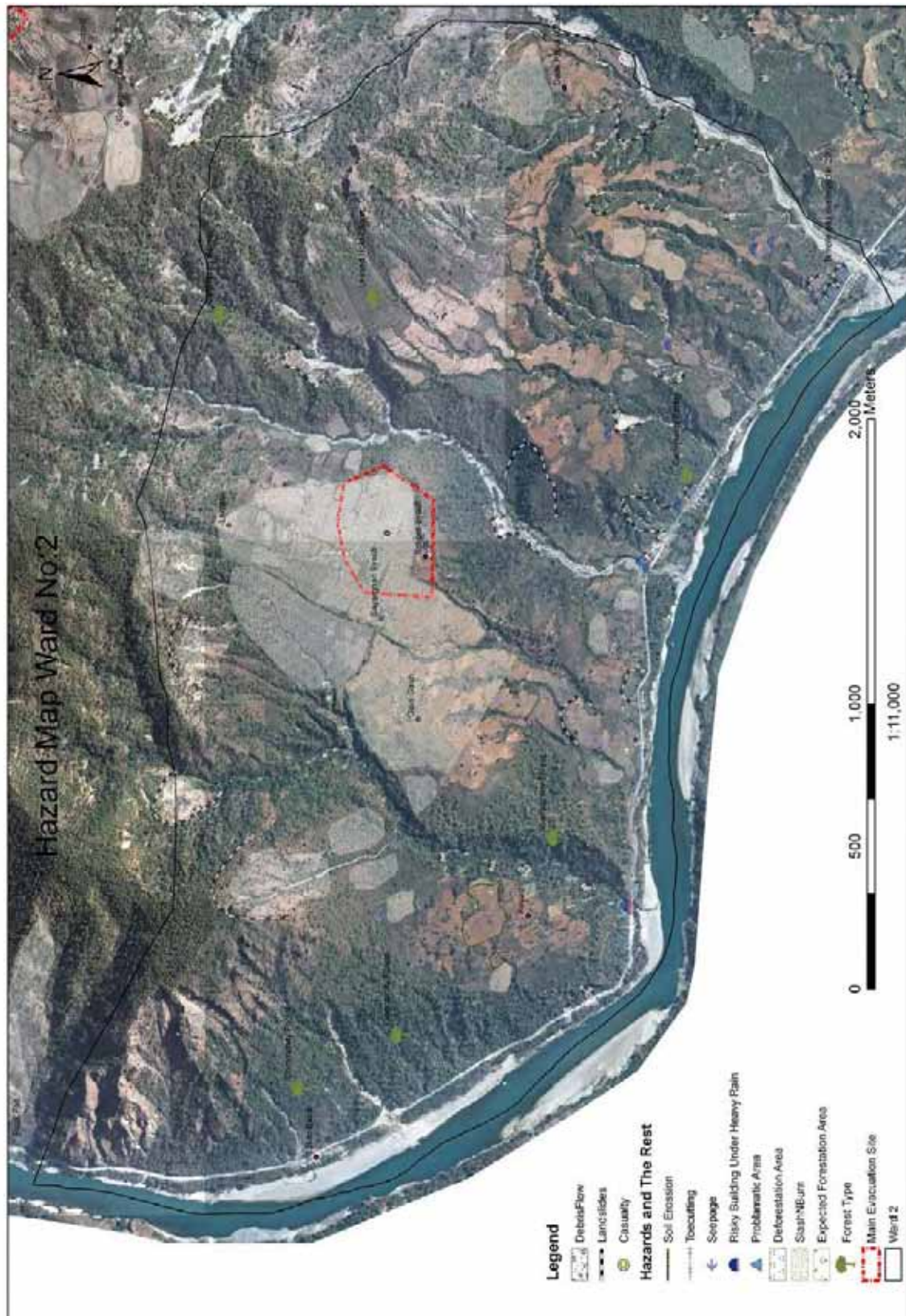


Figure XI-1-2 Kabilash Village Hazard Map Ward NO.2

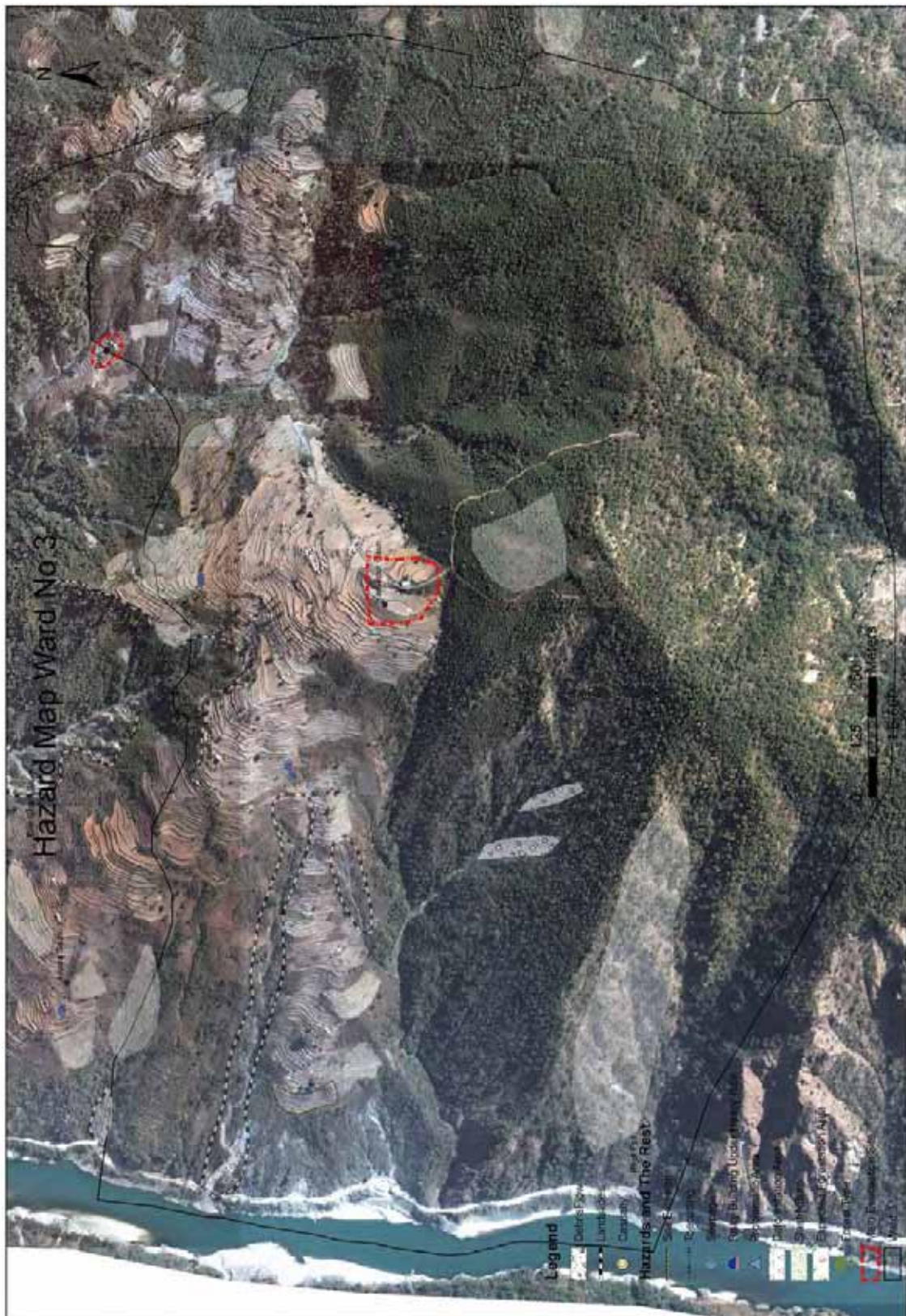


Figure XI-1-3 Kabilash Village Hazard Map Ward NO.3

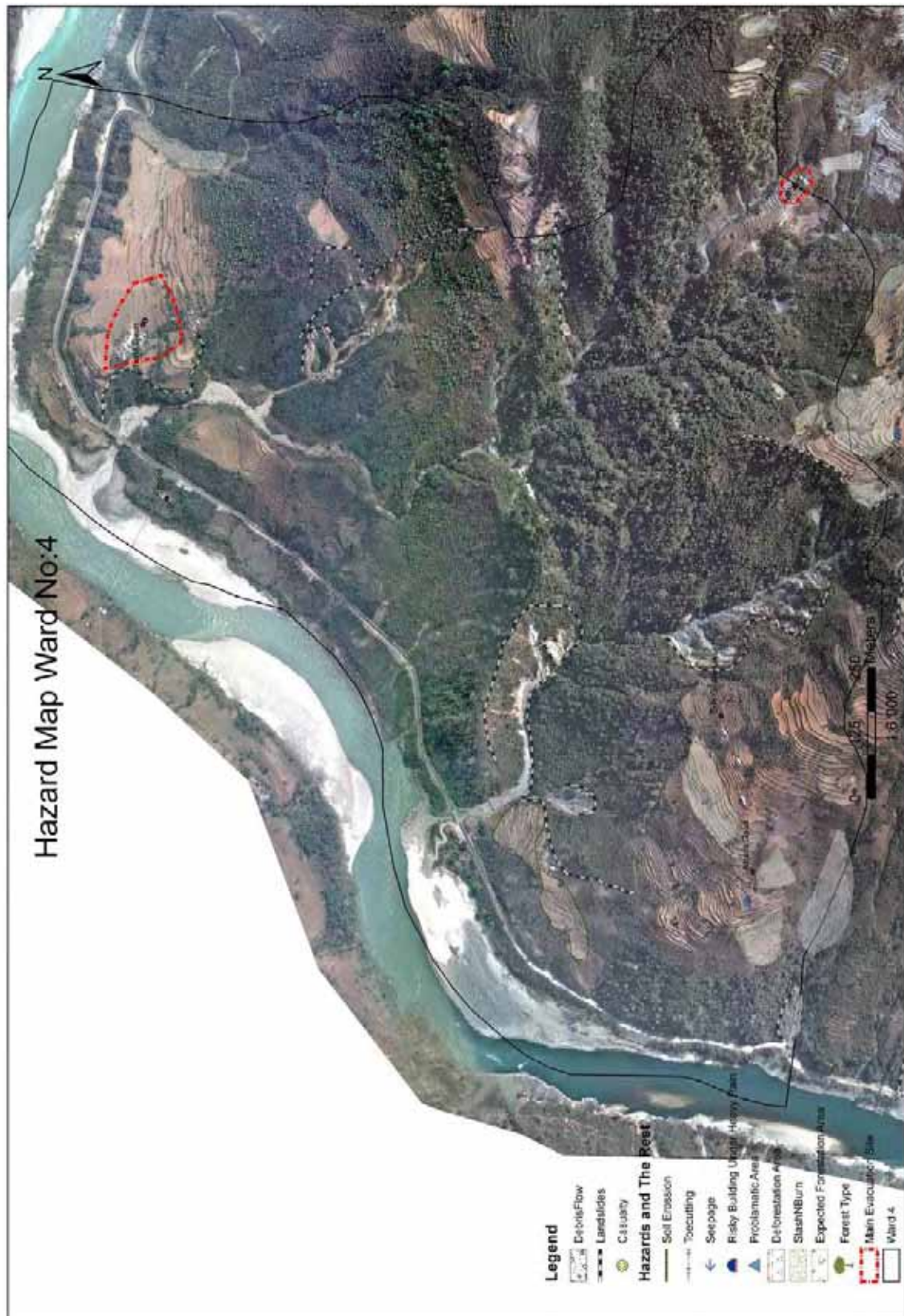


Figure XI-1-4 Kabilash Village Hazard Map Ward NO.4



Figure XI-1-5 Kabilash Village Hazard Map Ward NO.5

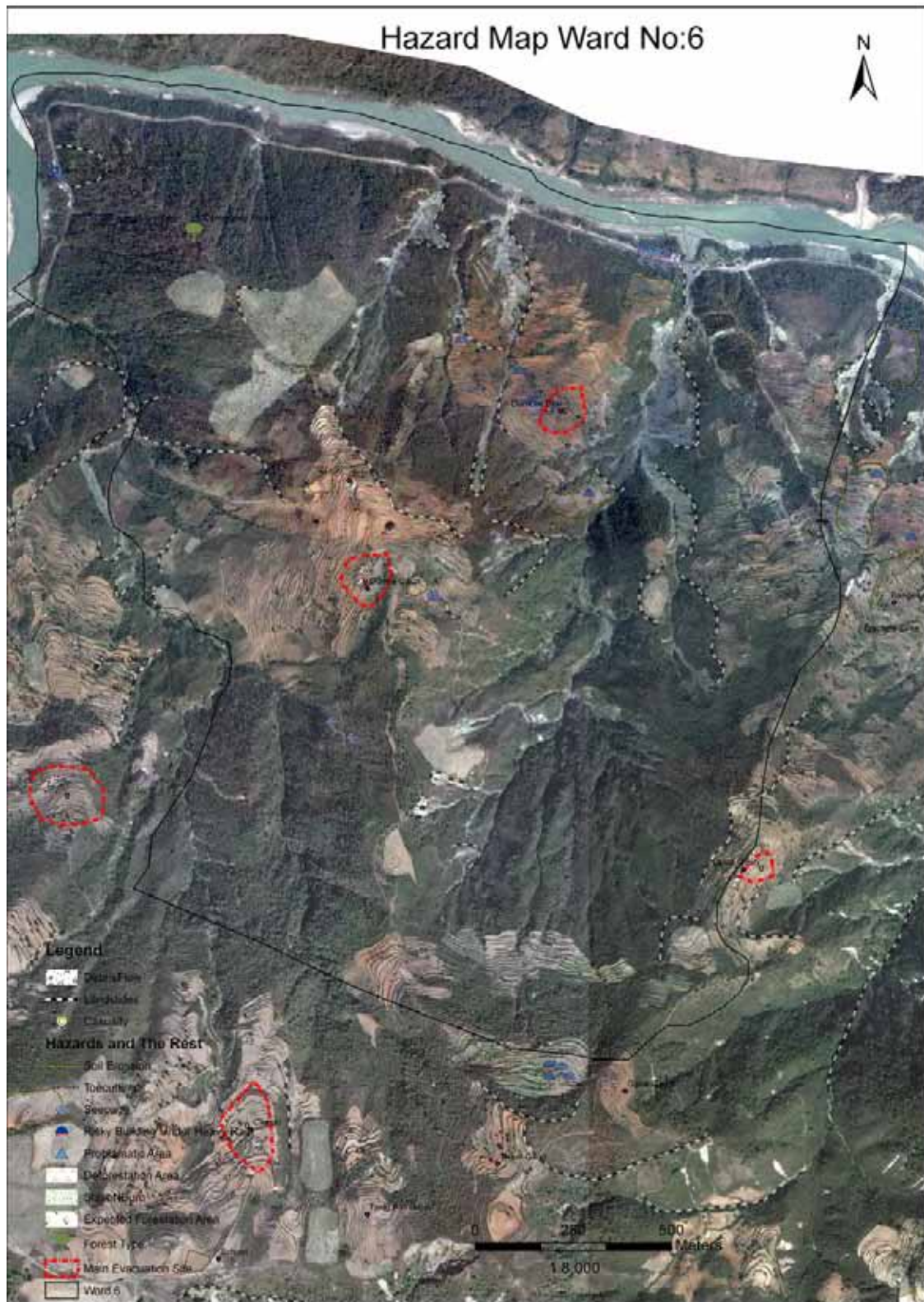


Figure XI-1-6 Kabilash Village Hazard Map Ward NO.6

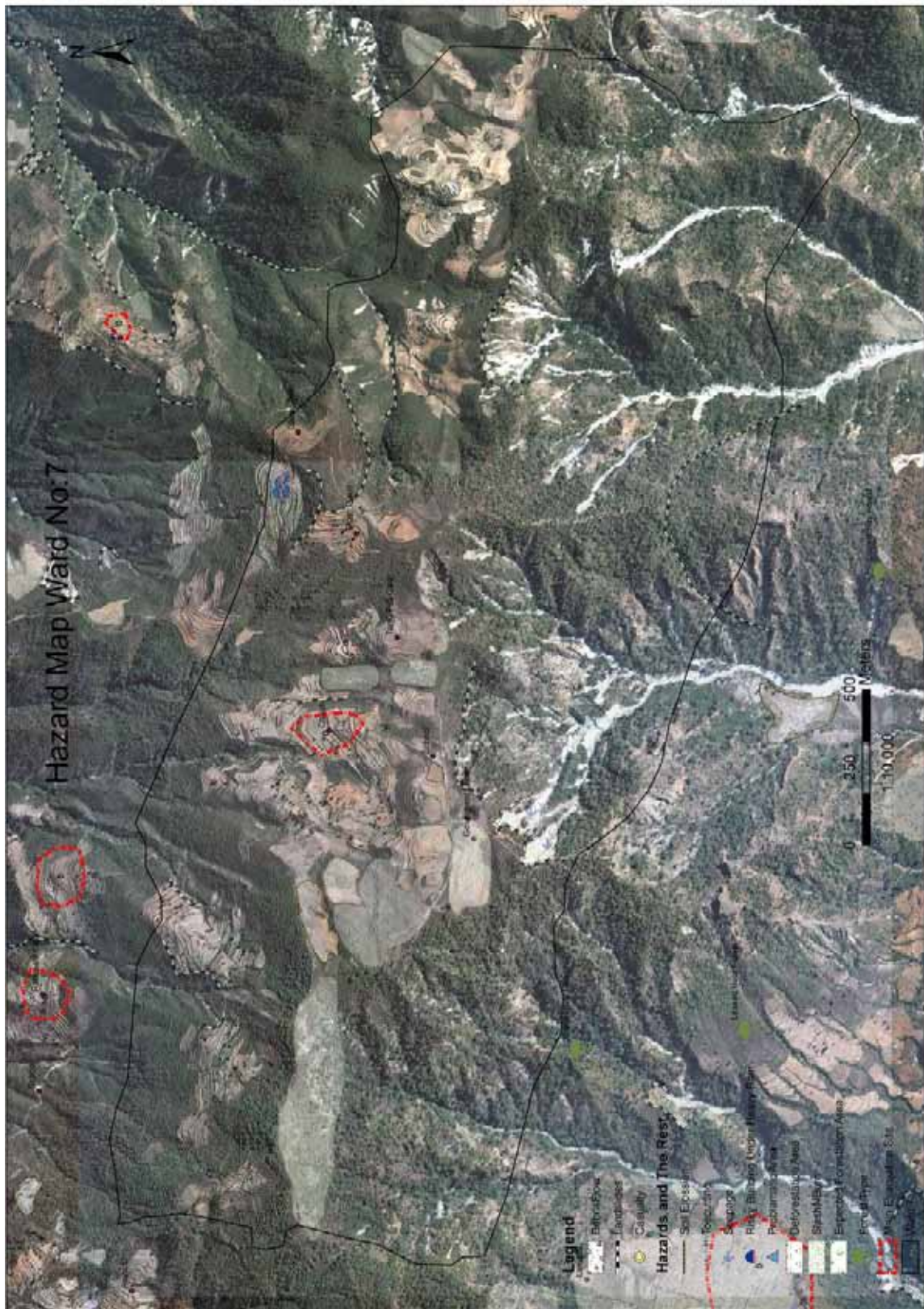


Figure XI-1-7 Kabilash Village Hazard Map Ward NO.7



Figure XI-1-8 Kabilash Village Hazard Map Ward NO.8



Figure XI-1-9 Kabilash Village Hazard Map Ward NO.9

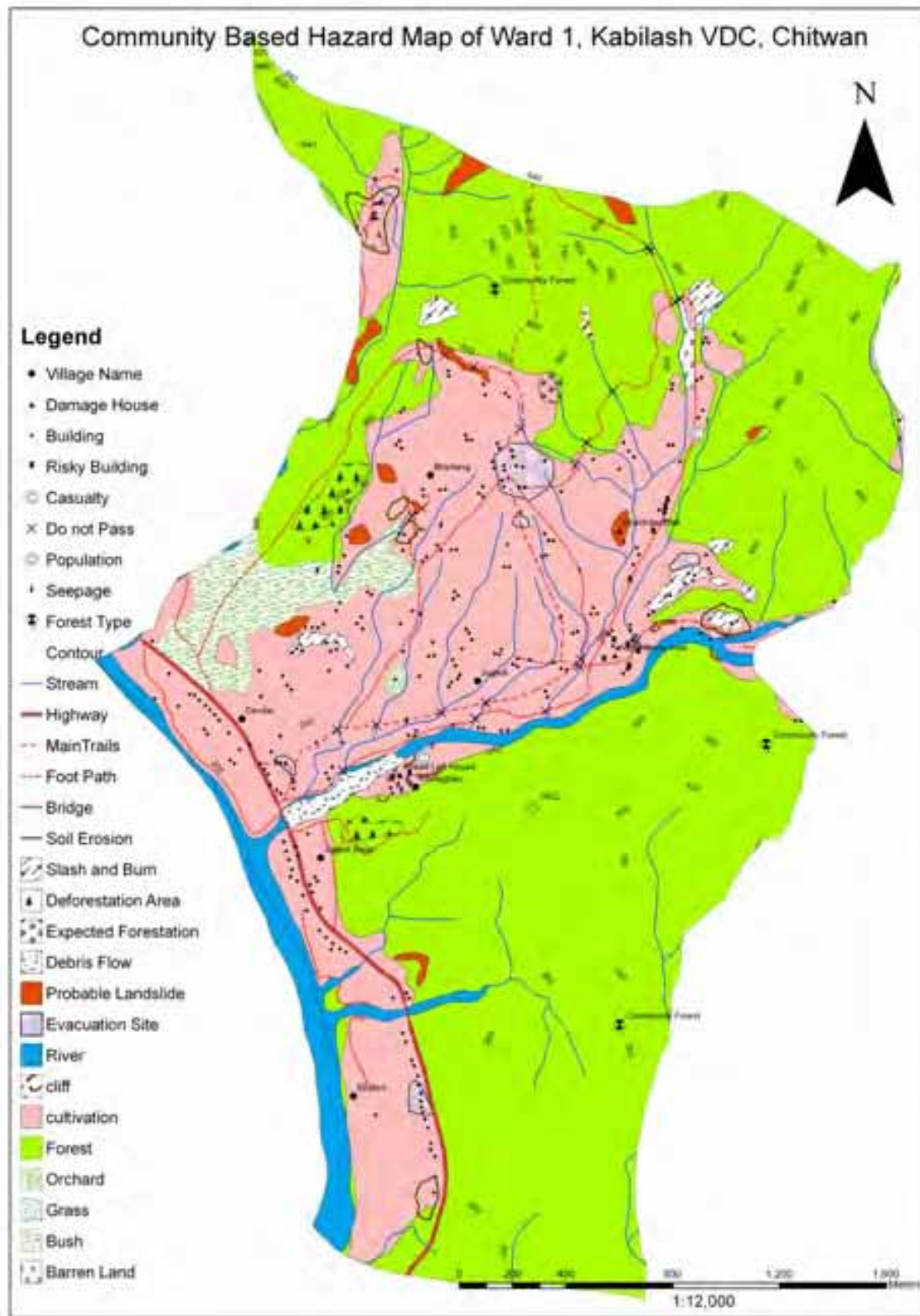


Figure XI-2-1 Kabilash Village Hazard Map Ward NO.1

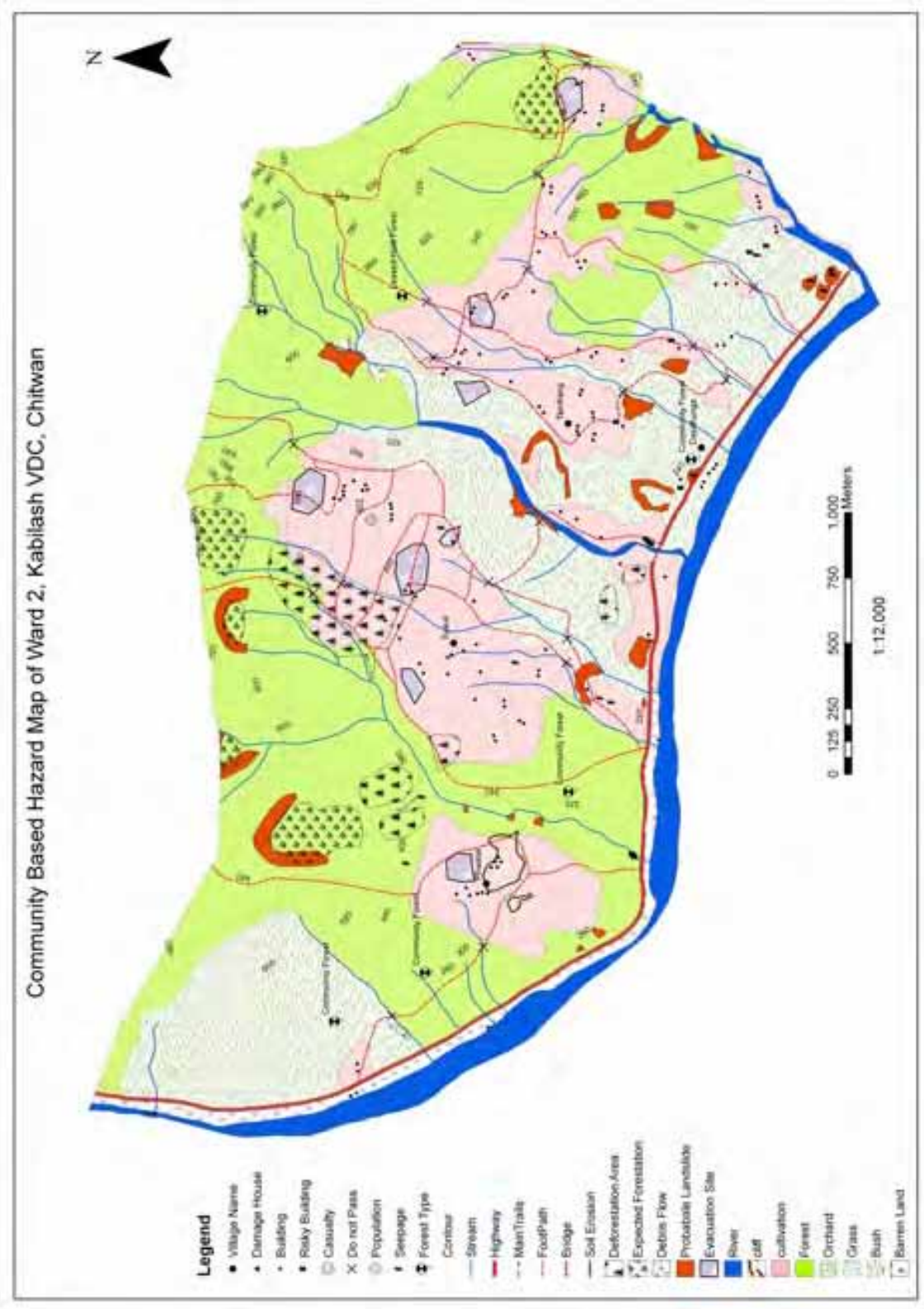


Figure XI-2-2 Kabilash Village Hazard Map Ward NO.1

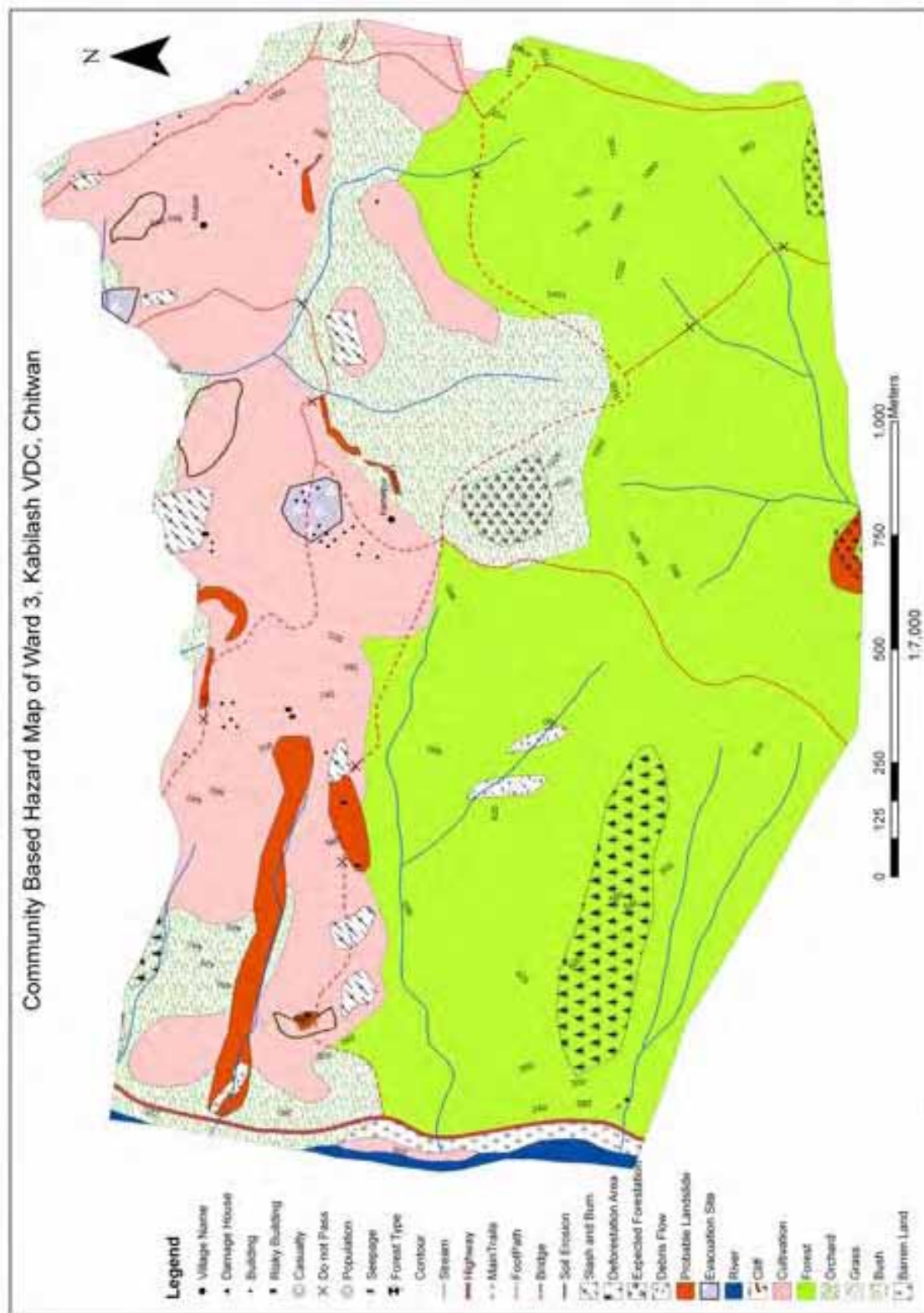


Figure XI-2-3 Kabilash Village Hazard Map Ward NO.1

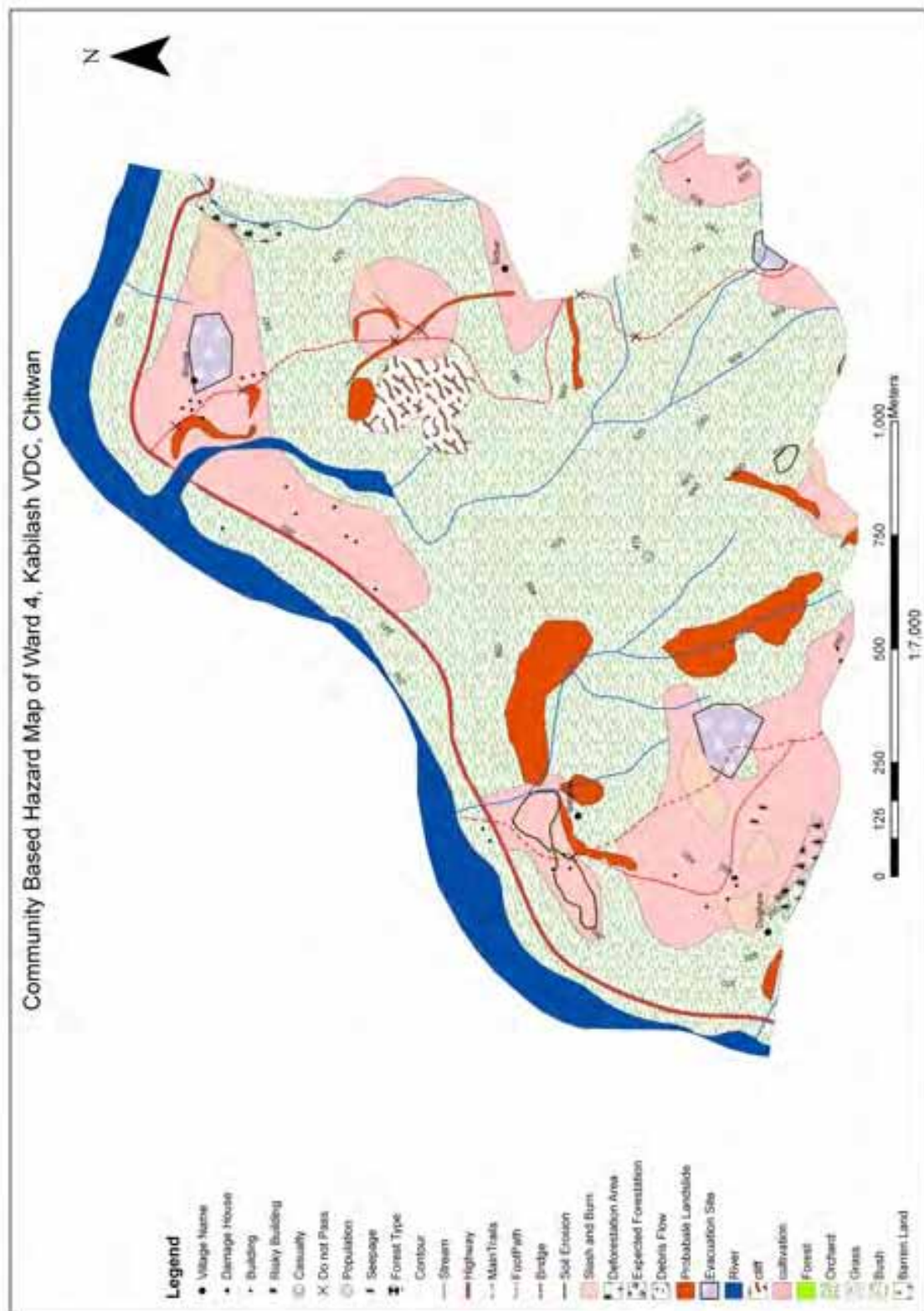


Figure XI-2-4 Kabilash Village Hazard Map Ward NO.1

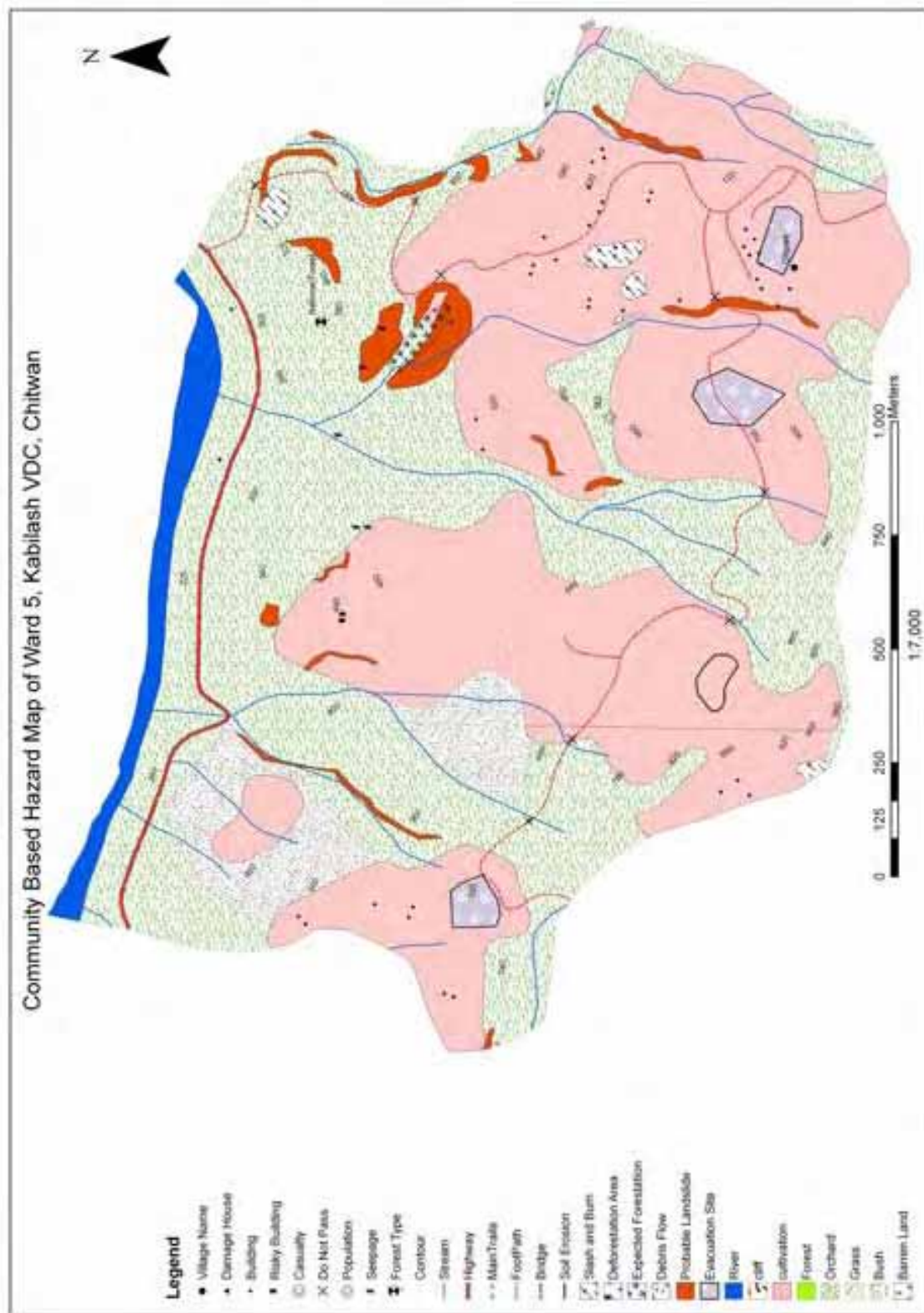


Figure XI-2-5 Kabilash Village Hazard Map Ward NO.1

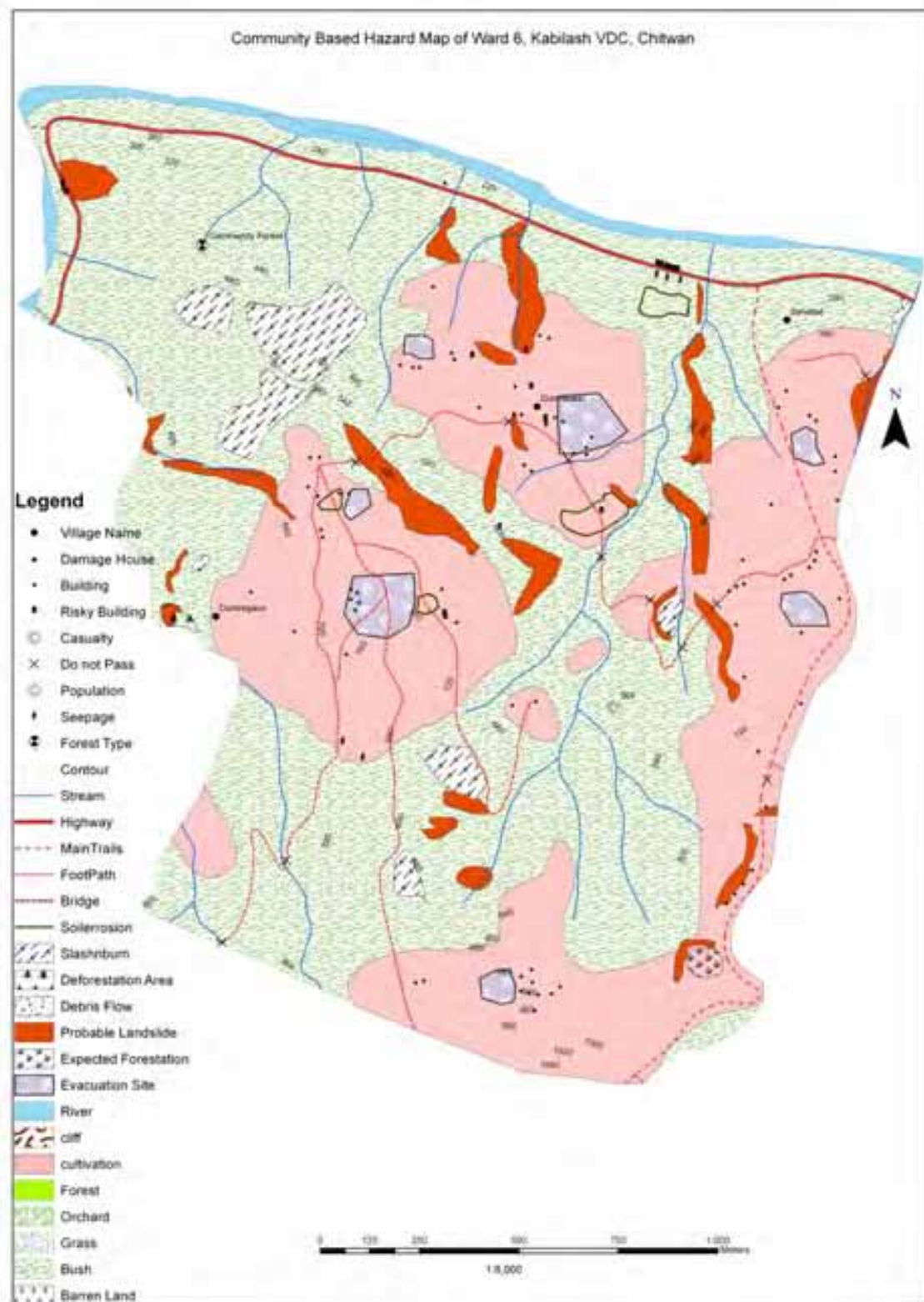


Figure XI-2-6 Kabilash Village Hazard Map Ward NO.1

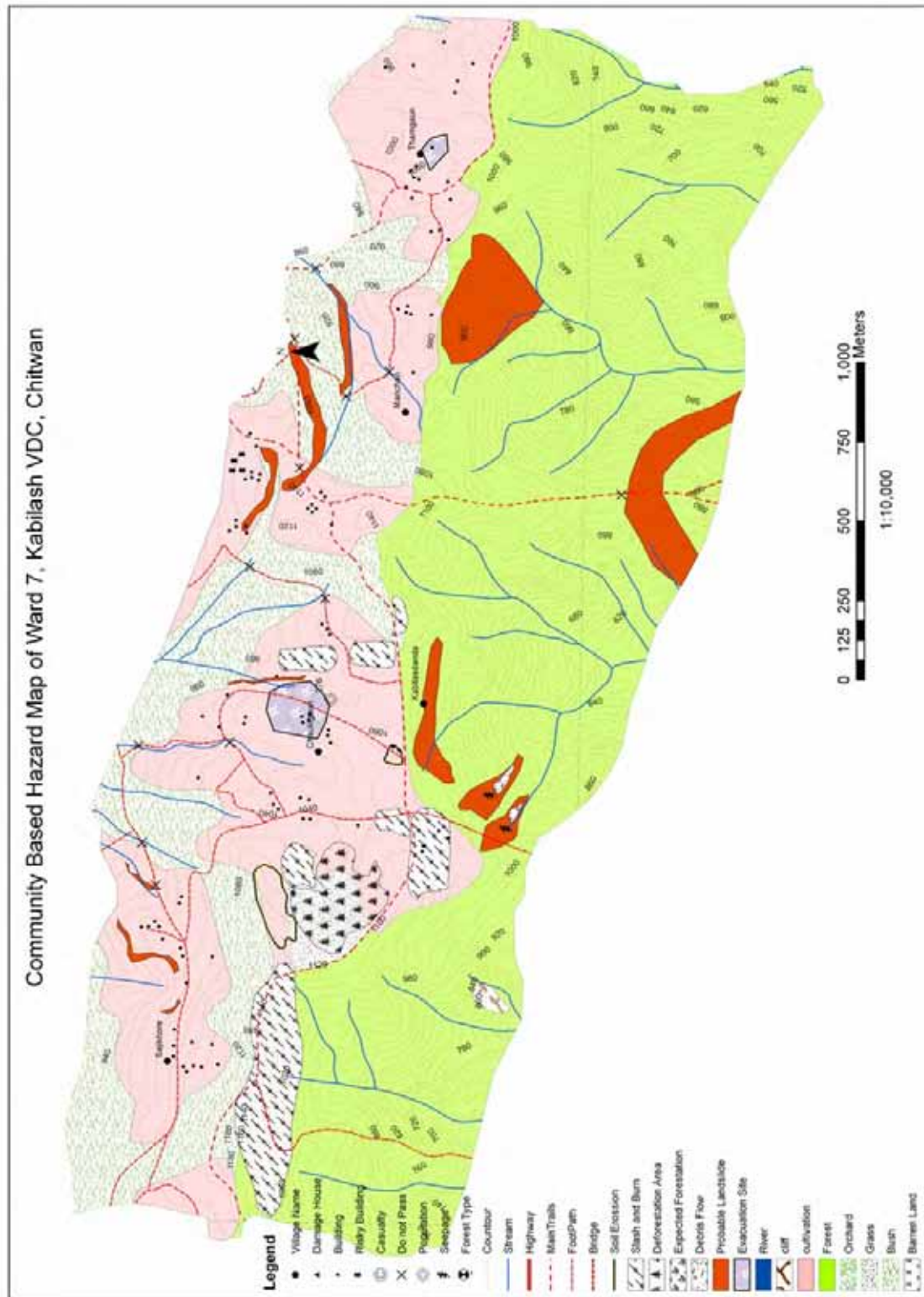


Figure XI-2-7 Kabilash Village Hazard Map Ward NO.1

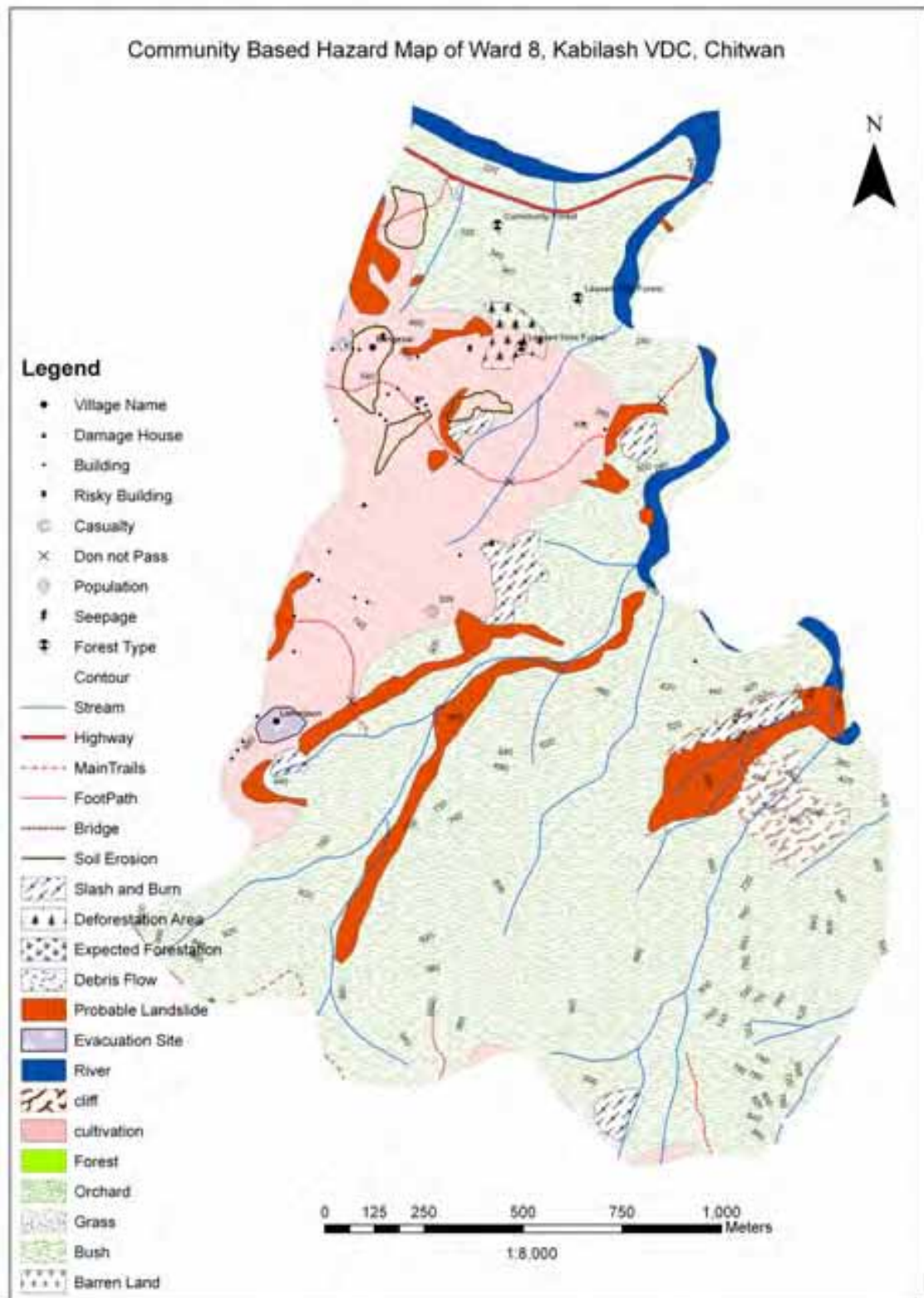


Figure XI-2-8 Kabilash Village Hazard Map Ward NO.1

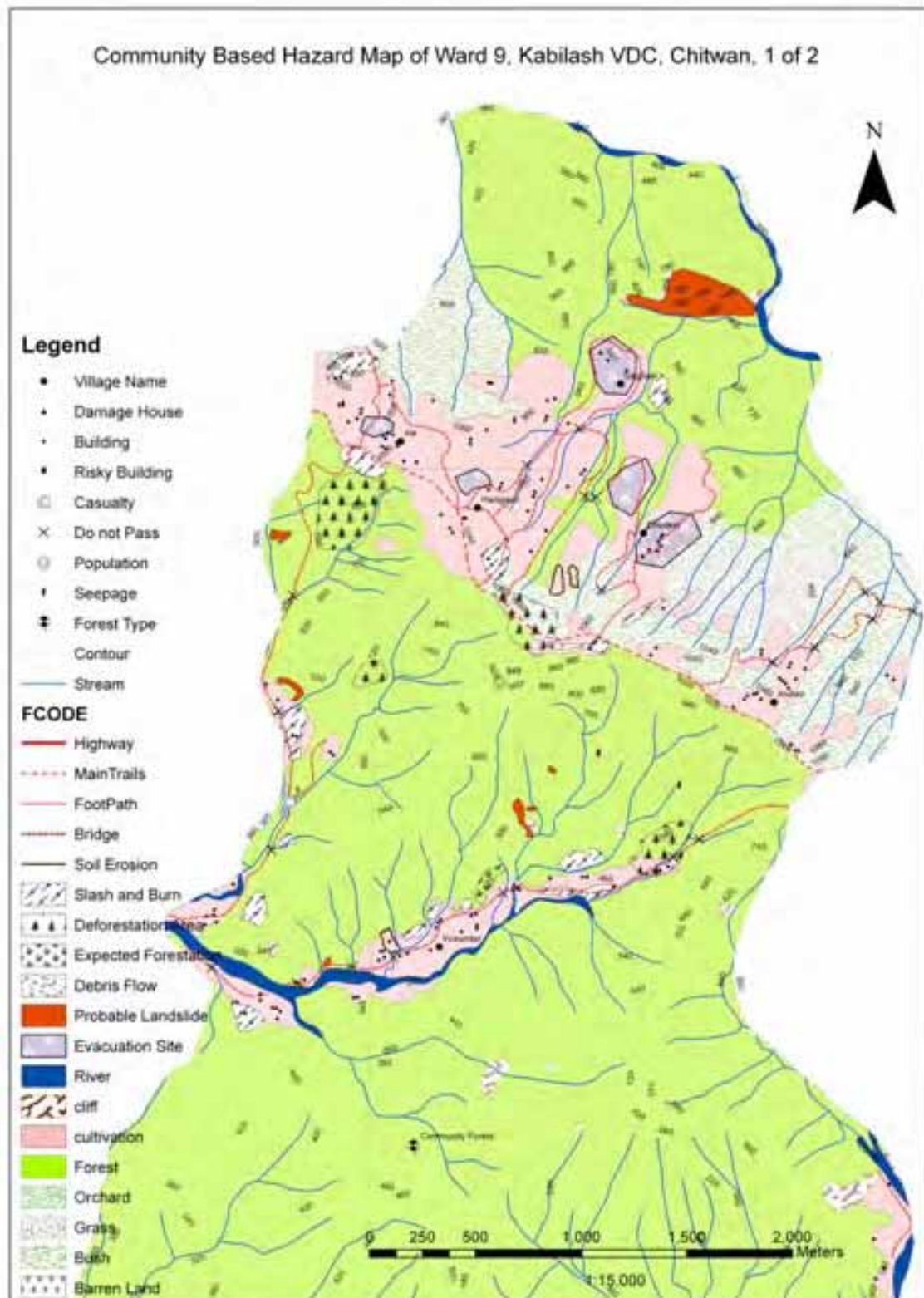


Figure XI-2-9 (1) Kabilash Village Hazard Map Ward NO.1

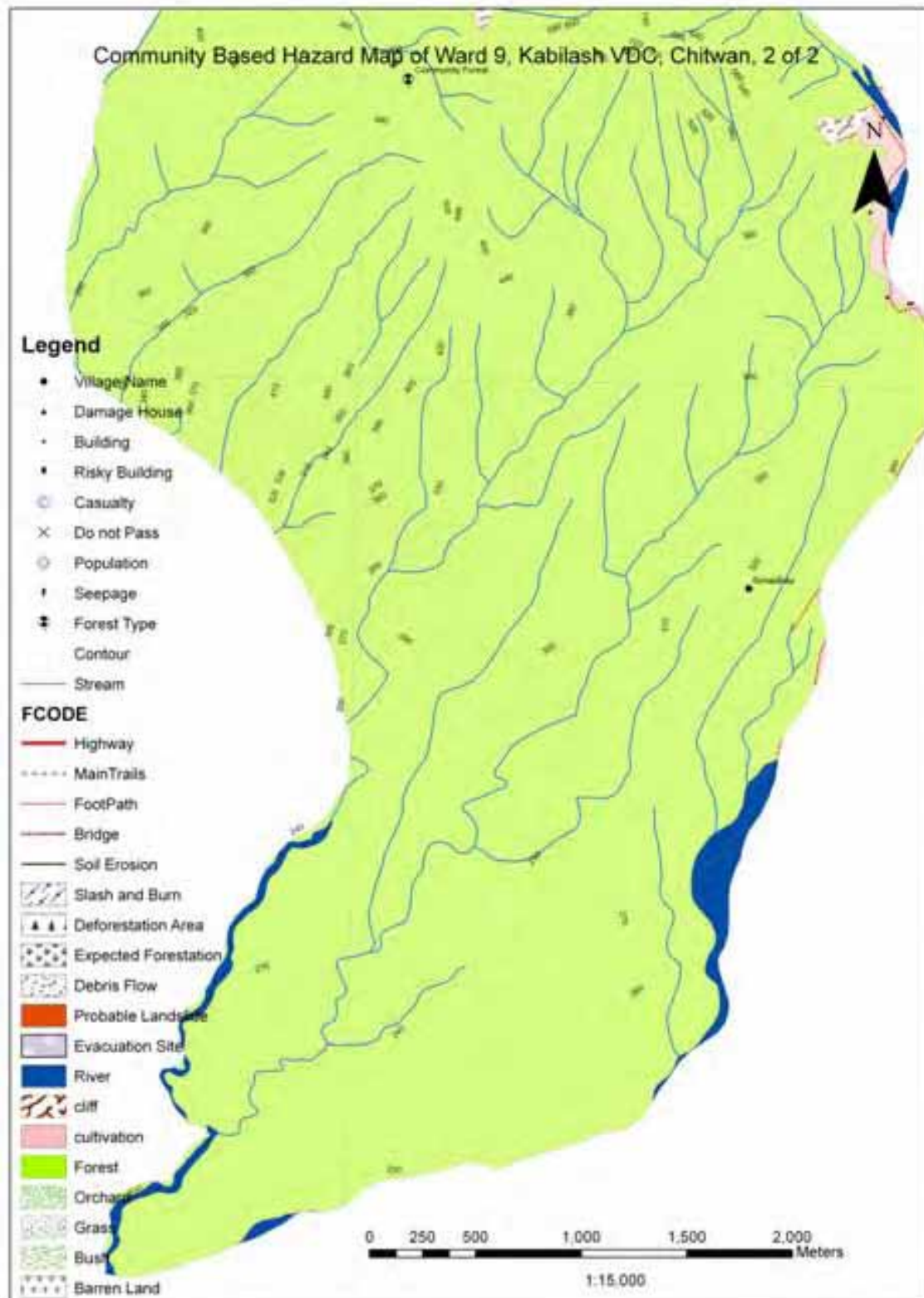


Figure XI-2-9 (2) Kabilash Village Hazard Map Ward NO.1