UN environment programme

CTCN UN Climate Technology Centre & Network

UN Climate Technology Centre and Network (CTCN), an operational arm of UNFCCC

Ministry of Forests and Environment, Government of Nepal

Customized weather and climate information system for climate-resilient agriculture in Nepal

Contract No.: UNEP/2022/339 (Umoja # 4700023937)

Output 4: Design the interface to disseminate location-specific customized 3-days weather forecast to farmers using identified communication mechanisms

Accepted and approved for payment.
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Clara Landeiro
Regional Manager, Asia-Pacific

29th December 2023

THE SMALL EARTH NEPAL - 2001

RMSI

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List of Acronyms

API	Application Programming Interface
CCMD	Climate Change Management Division
CHIRPS	Climate Hazards Group InfraRed Precipitation with Station
DHM	Department of Hydrology and Meteorology
ECMWF	European Centre for Medium-Range Weather Forecasts
ICT	Information and Communications Technology
ICWFDS	ICT-based Customized 3 Days Weather Forecast Dissemination System
IM	Instant Messaging
IST	Indian Standard Time
IT	Information Technology
NPT	Nepal Time
REST APIs	Representation State Transfer Application Programming Interface
SEN	Small Earth Nepal
SMS	Short Message/Messaging Service
SMTP	Simple Mail Transfer Protocol
TA	Technical Assistance
UK	United Kingdom
UN-CTCN	United Nations Climate Technology Centre and Network
VoIP	Voice-over-IP

1 Customized Weather Forecast Dissemination Mechanisms

There are several communication mechanisms which can be used to disseminate customized 3-days weather forecast to the users electronically. Based on our experience, following are the most widely used mechanisms globally and can be implemented in Nepal for this purpose.

1.1 Short Message/Messaging Service (SMS)

Short Message/Messaging Service, commonly abbreviated as SMS, is a text messaging service component of most telephone, Internet and mobile device systems. It uses standardized communication protocols that let mobile devices exchange short text messages.

To send the SMS messages, requires the SMS Gateway. An SMS Gateway enables a computer to send and receive SMS text messages to and from a SMS capable device over the global telecommunications network (normally to a mobile phone). The SMS Gateway translates the message sent, and makes it compatible for delivery over the network to be able to reach the recipient. The message length is of 160 characters but it depends on language and country wise also.

1.2 WhatsApp

WhatsApp (officially WhatsApp Messenger) is a freeware, cross-platform, centralized instant messaging (IM) and voice-over-IP (VoIP) service owned by United States tech conglomerate Meta Platforms. It allows users to send text, voice messages and video messages, make voice and video calls, and share images, documents, user locations, and other content. WhatsApp's client application runs on mobile devices, and can be accessed from computers.

1.3 Email

Electronic mail (email or e-mail) is a method of transmitting and receiving messages using electronic devices. It was conceived in the late 20th century as the digital version of, or counterpart to, mail (hence e- + mail). Email is a ubiquitous and very widely used communication medium; in current use, an email address is often treated as a basic and necessary part of many processes in business, commerce, government, education, entertainment, and other spheres of daily life in most countries.

Email operates across computer networks, primarily the Internet, and also local area networks. Today's email systems are based on a store-and-forward model. Email servers accept, forward, deliver, and store messages. Neither the users nor their computers are required to be online simultaneously; they need to connect, typically to a mail server or a webmail interface to send or receive messages or download it.

1.4 Facebook

Facebook is an online social media and social networking service owned by American technology company Meta Platforms. Created in 2004 by Mark Zuckerberg with four other Harvard College students and roommates, its name derives from the face book directories often given to American university students.

Facebook can be accessed from devices with Internet connectivity, such as personal computers, tablets and smartphones. After registering, users can create a profile revealing information about themselves. They can post text, photos and multimedia which are shared with any other users who have agreed to be their "friend" or, with different privacy settings, publicly. Users can also communicate directly with each other with Messenger, join common-interest groups, and receive notifications on the activities of their Facebook friends and the pages they follow.

Facebook provides the REST APIs through which one can integrate the Facebook feeds in the application based on login credentials provided.

1.5 X / Twitter

X, formerly known as Twitter, is an online social media and social networking service operated by the American company X Corp., the successor of Twitter, Inc. On X, registered users can post text, images and videos. Registered Users can also "like", repost, quote repost, comment on posts, direct message, video and audio call, bookmark, join lists and communities, and join public Spaces with other registered users. Posting information to the site is often referred to as tweeting, retweeting and quote tweeting.

Key aspects of these communication mechanisms have been summarized in Table 1.

Table 1: Key aspects of the different communication mechanisms

Aspects	SMS	WhatsApp	Email	Facebook	Twitter
Subscription Required	✗	✗	✗	✗	✗
Mobile Connectivity	✓	✗	✗	✗	✗
Internet Connectivity	✗	✓	✓	✓	✓
Cost associated	✓	✓	✗	✓	✓
Easy implementation of technology	✓	✓	✓	✗	✗
Ease of access	✓	✓	✓	✗	✗
User friendly	✓	✓	✗	✗	✗

In the context of Nepal and available resources, project team has considered three communication mechanisms (i.e., SMS, WhatsApp, and email) to be implemented in Nepal to disseminate the customized 3-days weather forecast to the users electronically.

1.6 Email Automation

Check for the EMAIL on a daily basis if Yes – Agro-meteorological advisory send to the Email.

If No, then Check for the Internet connectivity and check for the log table “tbl_api_email_log” to check the exact problem, fix the issue by reset the service.

Check for the SMTP Connection by debugging the code as shown in Figure 1.

```
public string SendMail(MailParameters param)
{

    var send_to = param.to;
    var send_subject = param.subject;
    var send_body = param.body;

    send_to = send_to.Substring(0, send_to.Length - 1);

    MailMessage mail = new MailMessage();
    SmtpClient SmtpServer = new SmtpClient();

    mail.To.Add(send_to);
    mail.From = new System.Net.Mail.MailAddress("price.rmsi@gmail.com");
    mail.Subject = send_subject;
    mail.IsBodyHtml = true;
    mail.Body = send_body;

    using (SmtpClient client = new SmtpClient())
    {
        client.Host = "smtp.gmail.com";
        client.EnableSsl = true;
        client.UseDefaultCredentials = false;
        client.Credentials = new NetworkCredential                              );
        client.Port = 587;

        try
        {
            client.Send(mail);
            return JsonConvert.SerializeObject("Success");
        }
        catch (Exception)
        {

            throw;
        }

    }
```

Figure 1: SMPT connection

1.7 WhatsApp Automation

WhatsApp message gets on a daily, 7 days, and seasonal Advisory if yes, Message deliver successfully.

If No, then check for the API subscription whether it is available or expire, if expired please renewal the API by using below given URL.

URL: https://textlocal-india.eu.webexconnect.io/login

1.8 SMS Automation

SMS message gets on a daily, 7 days & seasonal Advisory if yes, Message deliver successfully.

If No, then check for the API subscription whether it is available or expire, if expired please renewal the API by using below given URL.

URL: https://control.textlocal.in/login/

2 Testing of Customized Weather Forecast Dissemination Mechanisms at the Pilot Sites

Customized weather forecast dissemination mechanisms (i.e., SMS, WhatsApp, and Email) have been successfully tested at the three selected pilot sites in Nepal (Table 2). Refer Output-5 report given in Annexure-1 for the detailed pilot testing report.

Table 2: Details of the location selected for the testing of API dissemination mechanisms in Nepal

Location	District	Region
Malangawa	Sarlahi	Tarai Plain
Rainas Municipality	Lamjung	Middle Mountain
Bhojpur	Bhojpur	Middle Mountain

Annexure 1: Output-5 report

an application programming interface (API) has been developed for the automatic dissemination of location-specific customized 3-days weather forecast to farmers. It has been named as ICT-based Customized 3 Days Weather Forecast Dissemination System (ICWFDS). It has been developed in a user-friendly language and tested in selected locations and communities in Nepal. The details of these locations are furnished in Table 3 and their spatial distribution within the country is portrayed in Figure 2.

Table 3: Details of the location selected for the testing of API in Nepal

Location	District	Region
Malangawa	Sarlahi	Tarai Plain
Rainas Municipality	Lamjung	Middle Mountain
Bhojpur	Bhojpur	Middle Mountain

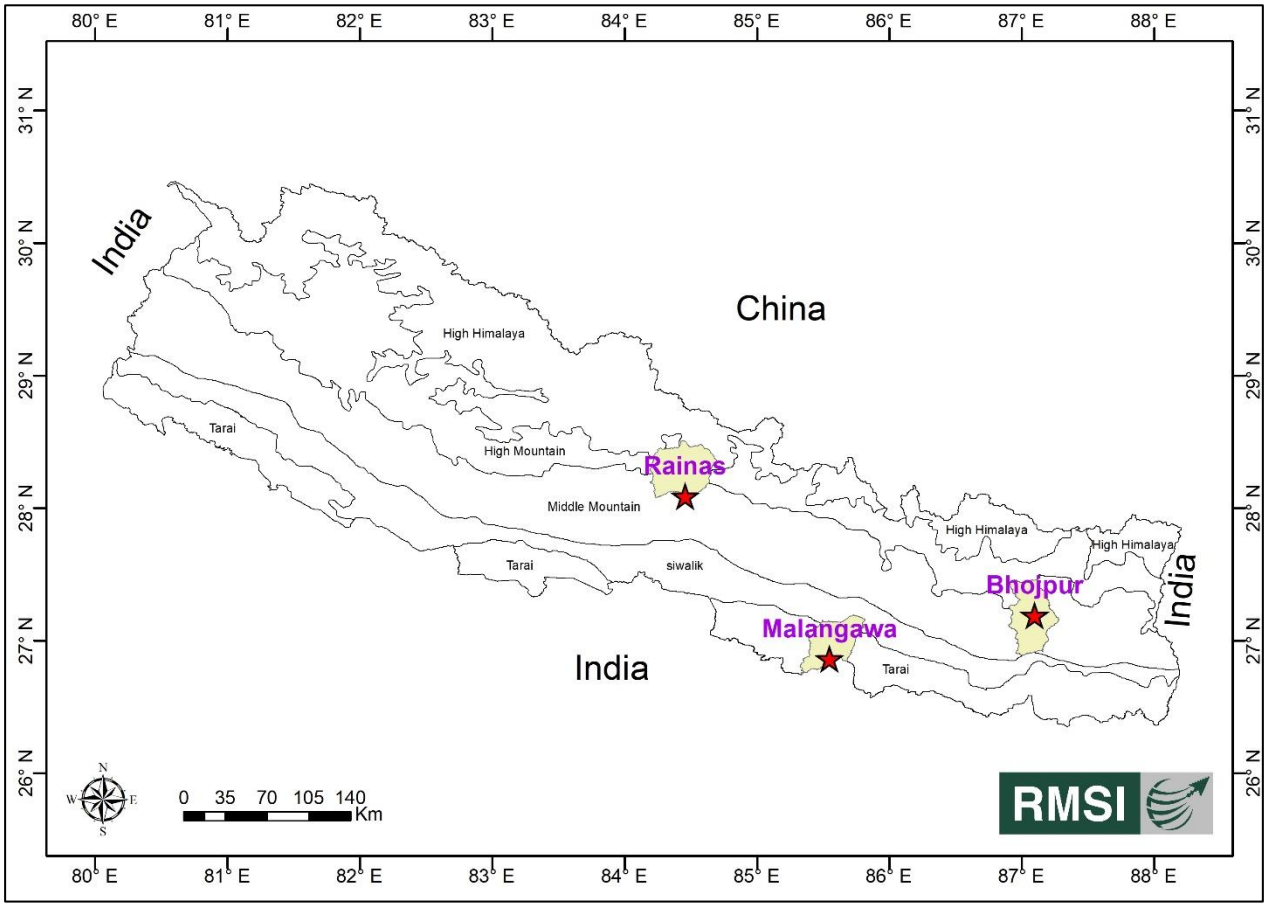


Figure 2: Spatial distribution of the locations selected for the testing of API in Nepal

2.1 The team of experts

The RMSI team of experts composed with the following members.

1. Dr. Sandeep VM – Climate Change, Agrometeorology and IT expert

2. Mr. Shivang Bhatnagar – Full stack developer and IT expert
3. Dr. Sujata Tamang - Gender Expert (National Expert-1)
4. Dr. Rajendra Uprety - Agricultural Engineer / Agro-meteorology Expert / Meteorologist (National Expert-2).

3 Day-1 (02nd December 2023)

The first two members of the RMSI team departed from New Delhi at 07.45 AM (IST) and arrived Kathmandu at 10.00 AM (NPT) on 02nd December 2023 by Air Vistara UK-157. After the clearance procedures at Kathmandu Airport, they departed to Malanwa in Sarlahi district which was the first location for the workshop and API testing. This location is situated in southern parts of the country and representing Tarai plains of Nepal. The team started from Kathmandu by 12.00 PM (NPT) by road and reached Lalbandi in Sarlahi district by 11.45 PM (NPT) and stayed at Hotel United Inn, Lalbandi.

4 Day-2 (3rd December 2023)

The team reached Hotel Sujata Palace situated at Malangwa, Sarlahi district by 09.00 AM (NPT) which was the venue of the workshop and testing the API. The national expert Dr. Rajendra Uprety joined with the RMSI team and together they made the initial arrangements for the workshop and API testing. By 10.00 AM (NPT) all the invited participants have arrived at the venue. The total number of participants was 29 which is found to be a good representation of local farming community and government officials. The details of the participants are furnished in Annexure -2.

The registration processes were completed by 10.30 AM and the meeting started with the self-introduction by the participants. It is followed by the brief introduction and purpose of this workshop by Dr. Rajendra Uprety, the national expert of this present assignment.

Thereafter, Dr. Sandeep VM, the team member of RMSI, explained the major objectives of this present assignment and the importance of the API for the dissemination of advisories based on three-day weather forecast. He explained the weather and climatic features of Nepal and the past and future climate scenarios of the country. He briefed the impact of climate change and weather aberrations on different sectors in Nepal. He also explained the weather observation system and its importance in Nepal. He briefed different types of weather forecasting services and their significance and applications. Then he explained about the Department of Hydrology and Meteorology (DHM), which is the agency providing weather related services in the country and its various types of services and their uses in different sectors. Finally, he briefed the importance of the API which has been developed as part of this assignment and its usage in disseminating the advisories based on three days weather forecast in Nepal. He also explained the past experience and success stories of RMSI in developing similar kind of applications over various countries in Asia and Africa such as Myanmar, Kenya, Ethiopia, etc.

He handed over the baton to Mr. Shivang Bhatnagar who is the key developer of the API named ICT-based Customized 3 Days Weather Forecast Dissemination System (ICWFDS). He started with the major features of ICWFDS. He explained about all the pages and features of the API and their details are furnished below.

4.1 Home Page

The home page of API which has been named as ICT-based Customized 3 Days Weather Forecast Dissemination System (ICWFDS) is displayed in Figure 3. The topmost row of the home page contains the contact details and the links to admin login, farmer registration, weather report and language selection. It should be noted that the API is available in three different languages viz., English, Hindi, and Nepali. The panel placed just below the first row contains the links to all the major applications of the ICWFDS. An introduction about ICWFDS has been made available just below the main panel in the home page (Figure 4).

Figure 3: Home page of API (i.e., ICWFDS)

Figure 4: Brief introduction on ICWFDS

The main panel in the homepage of the ICWFDS contains the links to all its major applications. The page for climatology will provide the district wise daily climatology for rainfall and phenological stage wise average maximum temperature and minimum temperature. The user can select the desired province and district from the respective drop-down menus. The drop-down menu "Select Season" allow the user to select three seasons viz., Summer, Winter and Spring seasons. Finally, the user can select the crop from the dedicated drop-down menu placed near to the "Search" button. The user can select rice and maize crops for summer season, wheat and potato crops from winter season and maize crop for spring season from this menu. After selecting the province, district, season and crops, the user may click on "search" button and an interactive map of the respective daily climatology for rainfall and pheno-phase wise maximum and minimum temperatures will be displayed in the panel as shown in Figure 5.

The daily climatology of rainfall has been prepared from bias-corrected Climate Hazards Group InfraRed Precipitation with Station (CHIRPS) data, which is a gridded data product with 0.05°*0.05° spatial duration. This data spanning between 50°N to 50°S and the data is available from 1981 to till date. For the present assignment, we downloaded the CHIRPS rainfall data during the past 30 years (1993-2022). The maximum temperature and minimum temperature data have been sourced from European Centre for Medium-Range Weather Forecasts (ECMWF) ERA5 data set in 0.25°*0.25° spatial resolution for the aforementioned period. The district wise daily rainfall and temperature data has been prepared using Thiessen Polygon method. After that, this daily dataset has been bias-corrected using linear scaling method with respect to the observed weather data. Thereafter, the daily climatology has been prepared and used to prepare graph presented in Figure 5.

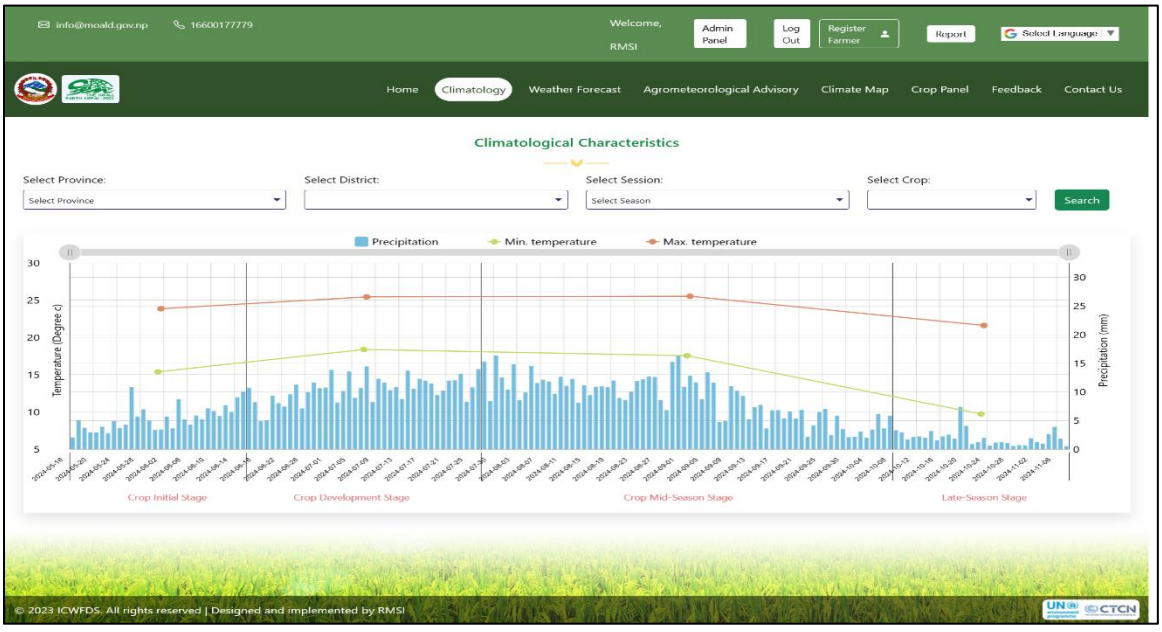


Figure 5: Daily climatology of rainfall and temperature

4.2 Weather forecast

The link to access the weather forecast has been placed on the immediate right-hand side of the climatology tab. It will provide the visualization of 3-days, 7-days, and seasonal forecasts for all the districts in Nepal. The visualization of 3-days weather forecast has been displayed in Figure 6. The interactive map will provide the day-1, day-2, and day-3 forecast for precipitation, maximum temperature, minimum temperature, relative humidity, and wind speed. The user can also click on a desired district in the map and the value of the forecast will be displayed for the selected district.

The visualization of 7-days weather forecast has been displayed in Figure 7. The interactive map will provide the 7-days forecast for precipitation, maximum temperature, minimum temperature, and relative humidity. The user can also click on a desired district in the map and the value of the forecast will be displayed for the selected district.

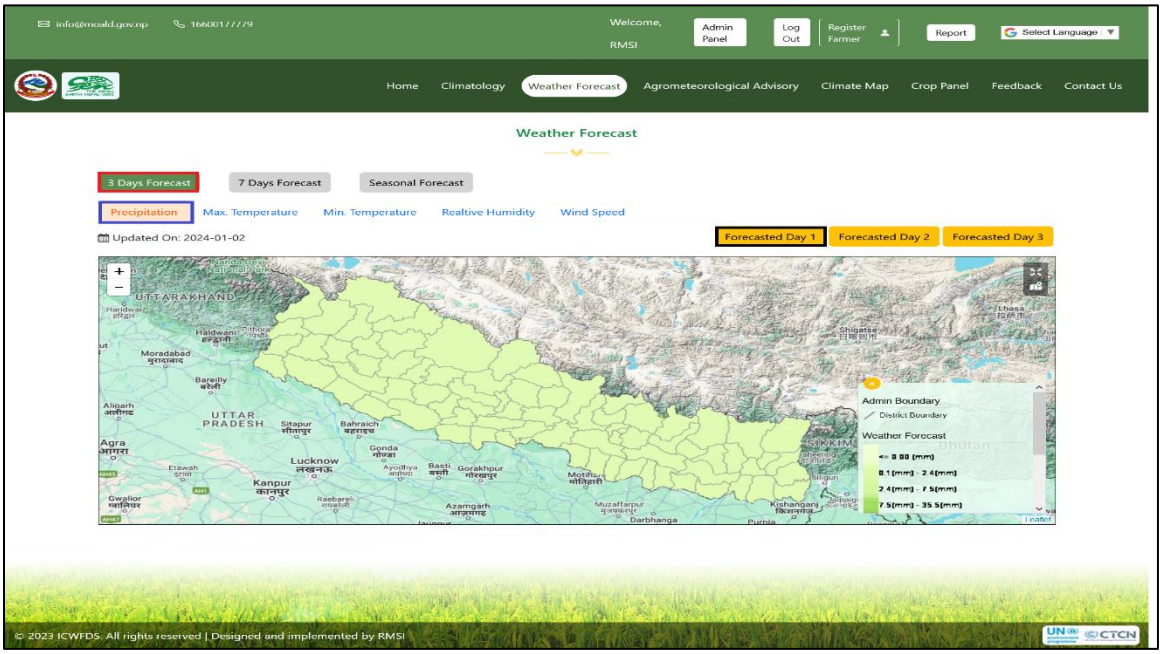


Figure 6: Web page to select 3-day weather forecast

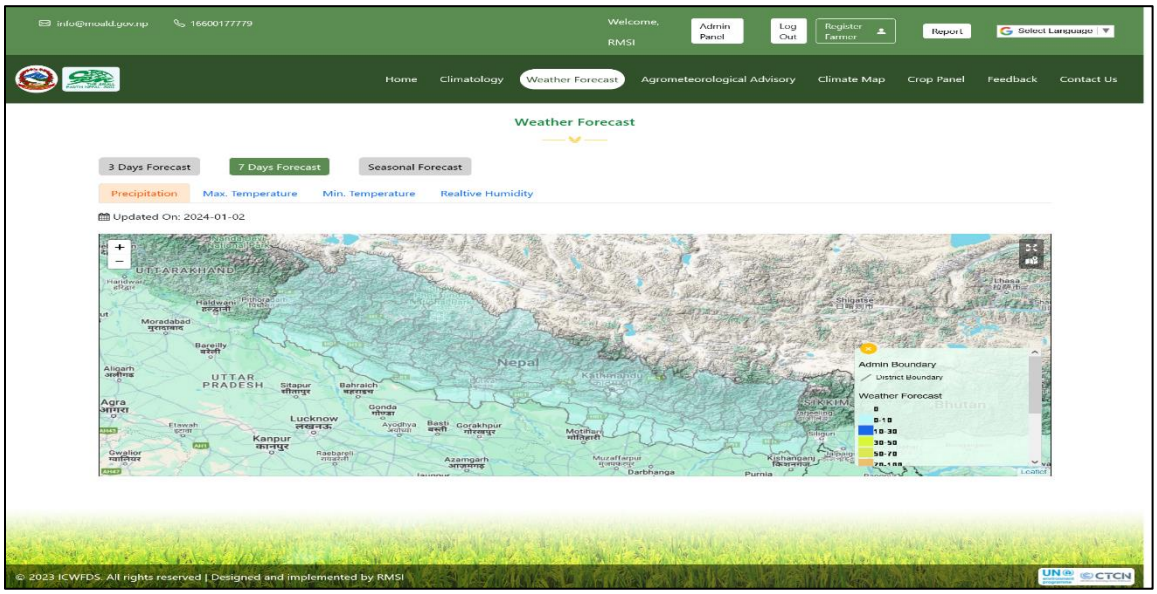


Figure 7: Web page to select 7-day weather forecast

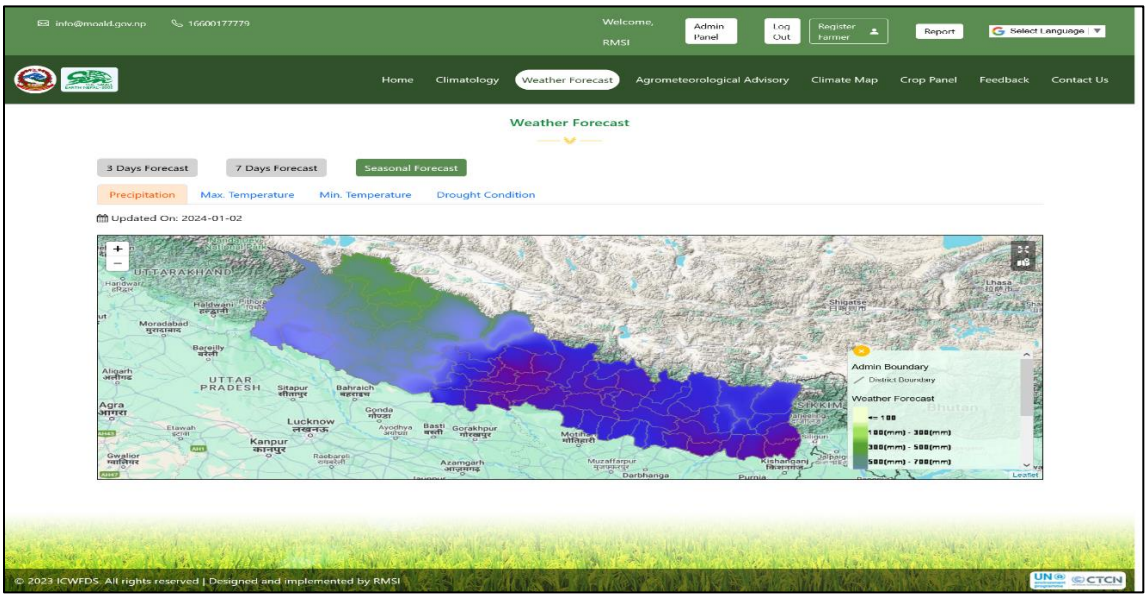


Figure 8: Web page to select seasonal forecast

The web page to select seasonal forecast has been displayed in Figure 8. The interactive map will provide the seasonal forecast for precipitation, maximum temperature, minimum temperature, and drought condition. The drought condition has been classified into different categories such a mild, moderate, severe, and extreme droughts. The user can also click on a desired district in the map and the value of the forecast will be displayed for the selected district.

4.3 Agrometeorological Advisories

The link to access the agrometeorological advisories has been placed in the main panel immediate right-hand side of the weather forecast (Figure 9). In the main page, the user can select a desired district and see a graphical representation of all the types of weather forecasts as shown in Figure 10.

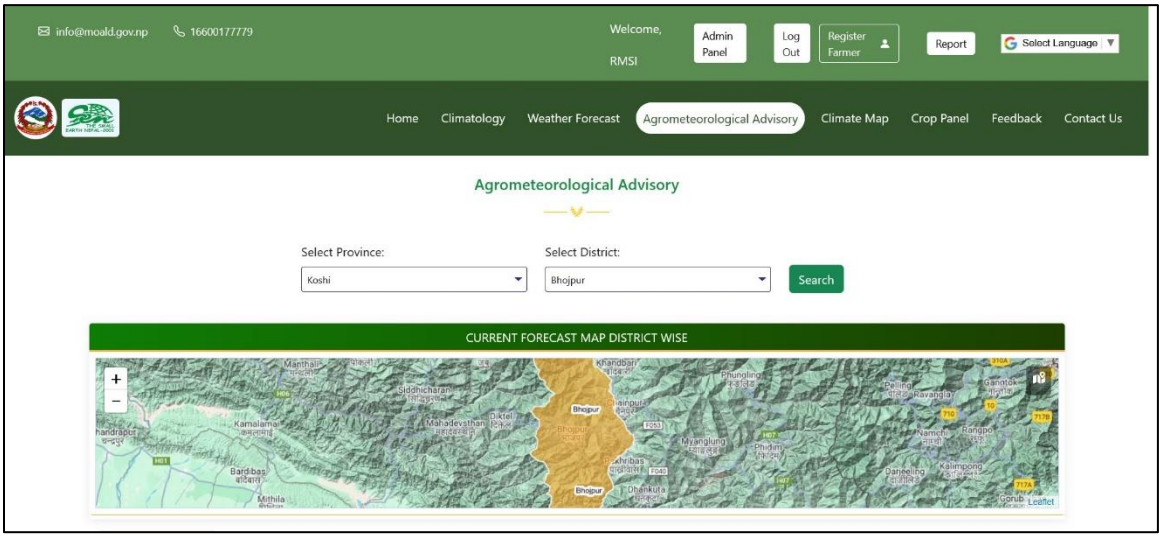


Figure 9: Main page of agrometeorological advisories

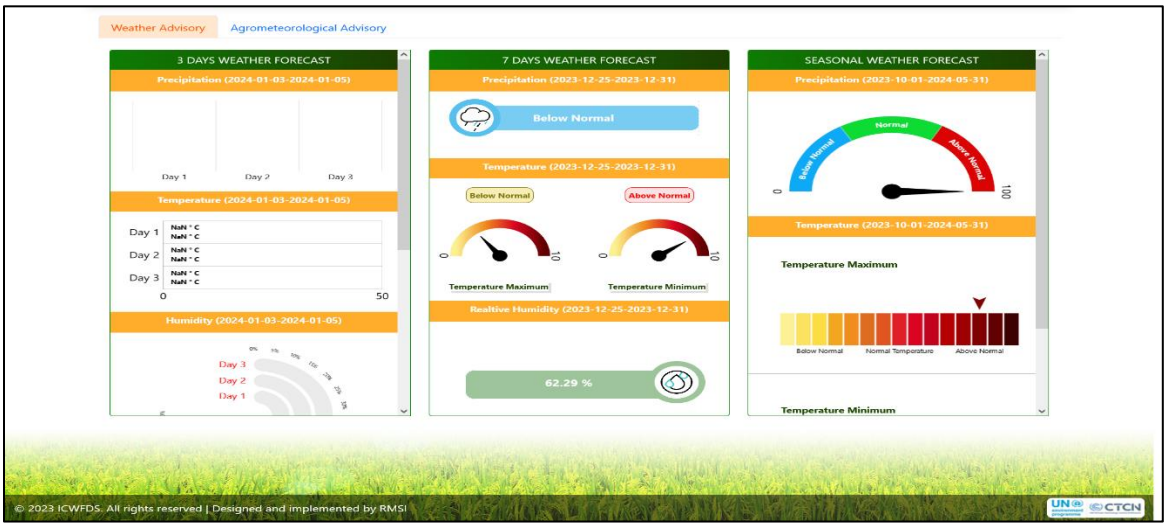


Figure 10: Graphical representation of weather forecast

The link to access agrometeorological advisories has been placed in this page as shown in Figure 11.

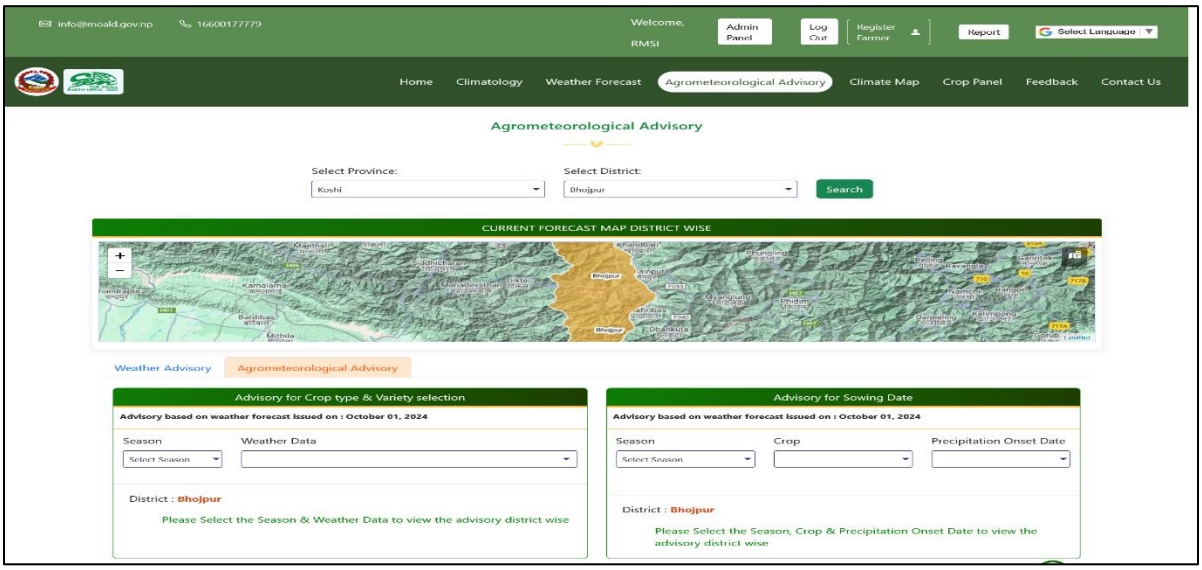


Figure 11: Link to access agrometeorological advisories

The advisory for crop type and variety selection can be accessed as shown in Figure 12. This action has to be performed by the system administrator. If summer season has been selected as shown in this figure, the following options will be popped down from the menu of weather data:

- Precipitation is likely to be deficient by between -19% and -50% of normal precipitation.
- Precipitation is likely to be deficient by equal or more than 50% of normal precipitation.
- Precipitation is likely to be in excess by more than 19% of normal precipitation.
- Precipitation is likely to be normal (+19% or -19% of normal precipitation).
- Total precipitation is likely to be normal but duration is likely to be shorter.

If winter season has been selected as shown in this figure, the following options will be popped down from the menu of weather data:

- Temperature is likely to be normal.
- Temperature is likely to be higher than normal temperature.
- Temperature is likely to be lower than normal temperature.

If spring season has been selected as shown in this figure, the following options will be popped down from the menu of weather data:

- Temperature is likely to be normal.
- Temperature is likely to be higher than normal temperature.

After the selection of season and weather data, the advisory for crop and variety selection will be displayed the space below of these drop-down menus. The generated advisories can be sent to the users by the administrator by clicking the send button as shown in red circle of Figure 12.

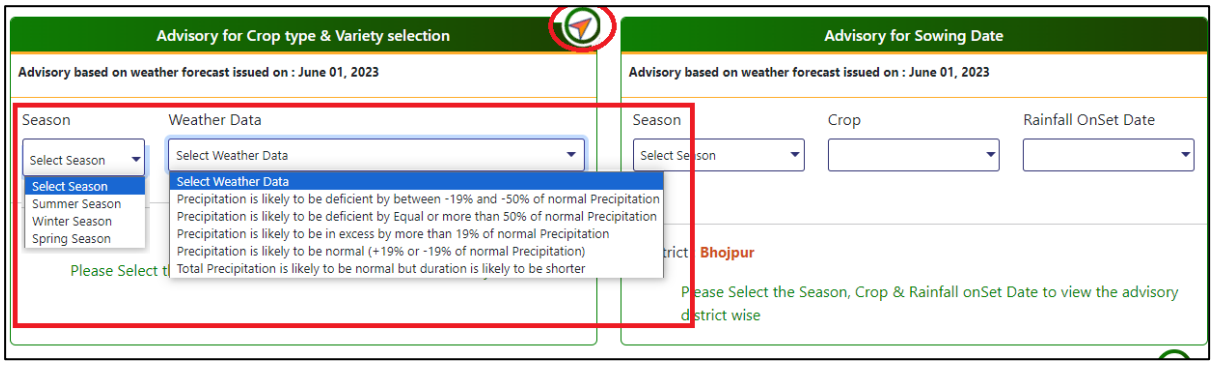


Figure 12: advisory for crop type and variety selection

After tapping the send button, a pop-up window will appear to send the advisories to the selected users by email (Figure 13). The administrator can select the users from the list and click the send email button. Then, the advisories will be sent to all the selected users by email.

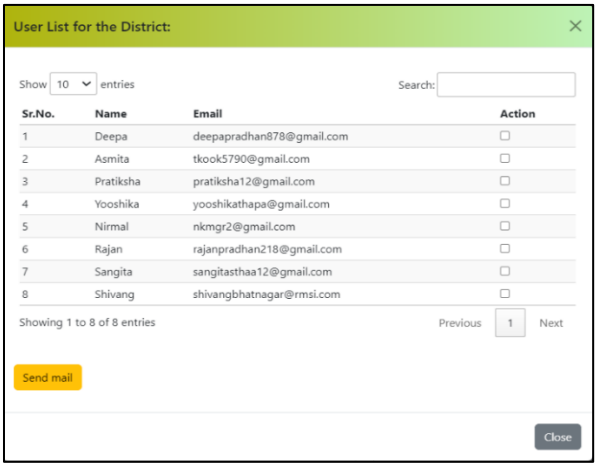


Figure 13: Option to send the advisories to the selected users by email

4.4 Advisory for Sowing Date

The panel of advisory for sowing date has been placed on the right-hand side of the option for the advisory for crop type and variety selection (Figure 14). The season specific advisory has been incorporated in this option for summer, winter and spring seasons for multiple crops such as rice and maize for summer season, wheat and potato for winter season and maize for spring seasons. After selecting the season and crop, the admin has to select the rainfall onset date and then the advisory for sowing date will be generated as indicated in this figure. The admin can send this advisory to all the users by email by tapping the send button as discussed in the previous section.

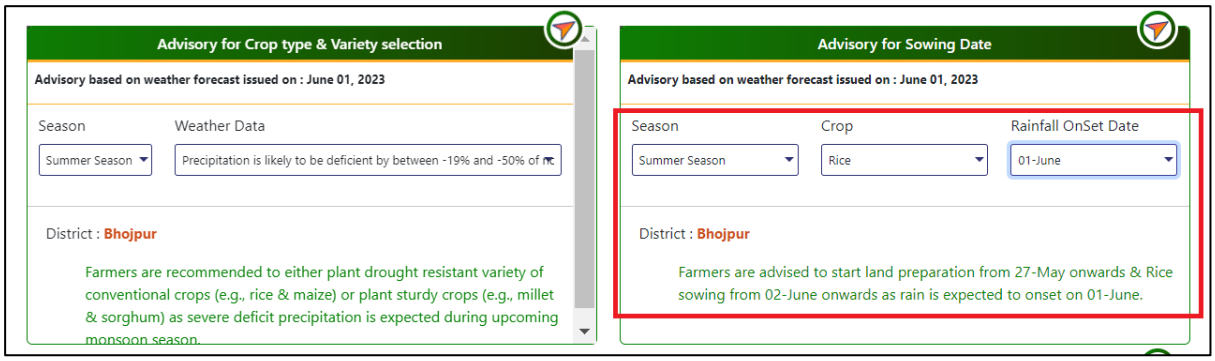


Figure 14: Advisory for sowing date

4.5 Advisory for deficit or excess rainfall

The panel of advisory for deficit or excess rainfall has been placed at below the option for advisory for crop type and variety selection (Figure 14). The season specific advisory has been incorporated in this option for summer, winter and spring seasons for multiple crops such as rice and maize for summer season, wheat and potato for winter season and maize for spring seasons. The admin can select the season and crop from the respective dropdown menu and below that he/she can see the precipitation condition for previous, current and upcoming weeks (normal/below normal/above normal).

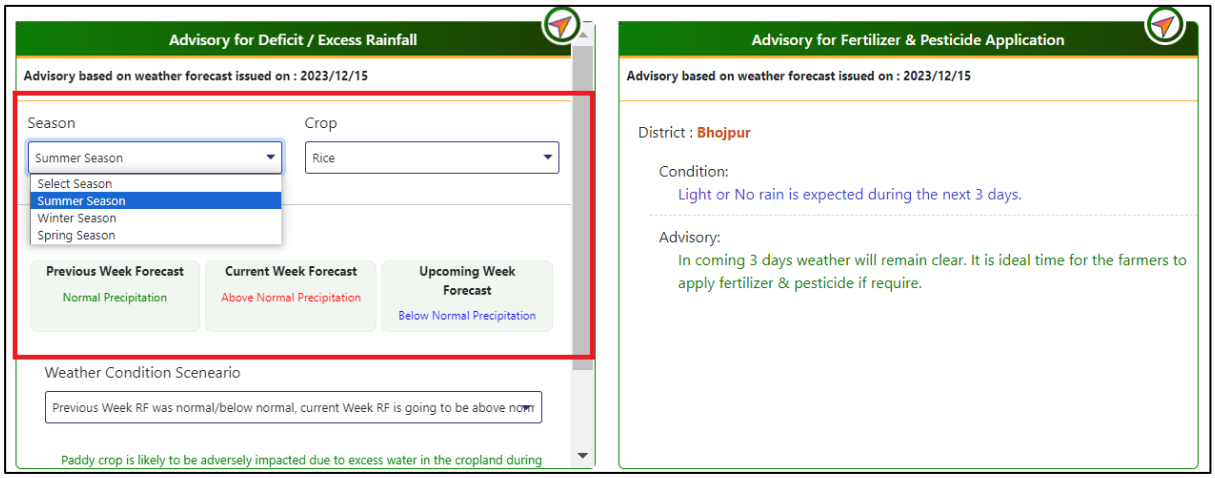


Figure 15: Advisory for deficit or excess rainfall

The most important element in this selection is the selection of weather condition scenario as indicated in Figure 16. Different scenarios have been incorporated for various seasons. In the case of summer season, the following scenarios have been included:

- Previous week rainfall was normal/below normal, current week rainfall is going to be above normal, and above normal rainfall is predicted for the upcoming week.
- Previous week rainfall was normal/below normal, current week rainfall is going to be normal/below normal, and above normal rainfall is predicted for the upcoming week.

- Previous week rainfall was above normal, current week rainfall is going to be normal/below normal, and above normal rainfall is predicted for the upcoming week.
- Previous week rainfall was normal, current week rainfall is going to be normal, and normal rainfall is predicted for the upcoming week.
- Previous week rainfall was below normal, current week rainfall is going to be below normal, and normal rainfall is predicted for the upcoming week.
- Previous week rainfall was normal/above normal, current week rainfall is going to be below normal, and normal rainfall is predicted for the upcoming week.
- Previous week rainfall was below normal, current week rainfall is going to be normal, and normal rainfall is predicted for the upcoming week.
- Previous week rainfall was below normal, current week rainfall is going to be normal/above normal, and below normal rainfall is predicted for the upcoming week.
- Previous week rainfall was normal/above normal, current week rainfall is going to be normal/above normal, and below normal rainfall is predicted for the upcoming week.
- Previous week rainfall was normal/above normal, current week rainfall is going to be below normal, and below normal rainfall is predicted for the upcoming week.
- Previous week rainfall was below normal, current week rainfall is going to be below normal, and below normal rainfall is predicted for the upcoming week.
- Previous week rainfall was above normal, current week rainfall is going to be above normal, and above normal rainfall is predicted for the upcoming week.

In the context of winter and spring seasons, following scenarios have been included:

- Previous week mean temperature was above normal, current week mean temperature is going to be above normal, and above normal mean temperature is predicted during the upcoming week.
- Previous week mean temperature was normal, current week mean temperature is going to be above normal, and above normal mean temperature is predicted during the upcoming week.
- Previous week mean temperature was below normal, current week mean temperature is going to be above normal, and above normal mean temperature is predicted during the upcoming week.
- Previous week mean temperature was above normal, current week mean temperature is going to be normal, and above normal mean temperature is predicted during the upcoming week.
- Previous week mean temperature was below normal, current week mean temperature is going to be normal, and above normal mean temperature is predicted during the upcoming week.
- Previous week mean temperature was above normal, current week mean temperature is going to be below normal, and above normal mean temperature is predicted during the upcoming week.
- Previous week mean temperature was normal, current week mean temperature is going to be below normal, and above normal mean temperature is predicted during the upcoming week.
- Previous week mean temperature was normal, current week mean temperature is going to be normal, and above normal mean temperature is predicted during the upcoming week.
- Previous week mean temperature was below normal, current week mean temperature is going to be below normal, and above normal mean temperature is predicted during the upcoming week.

- Previous week mean temperature was normal, current week mean temperature is going to be normal, and above normal mean temperature is predicted during the upcoming week.
- Previous week mean temperature was below normal, current week mean temperature is going to be below normal, and above normal mean temperature is predicted during the upcoming week.
- Previous week mean temperature was above normal, current week mean temperature is going to be below normal, and normal mean temperature is predicted during the upcoming week.
- Previous week mean temperature was below normal, current week mean temperature is going to be normal, and above mean temperature is predicted during the upcoming week.
- Previous week mean temperature was below normal, current week mean temperature is going to be above normal, and normal mean temperature is predicted during the upcoming week.
- Previous week mean temperature was normal, current week mean temperature is going to be below normal, and normal mean temperature is predicted during the upcoming week.
- Previous week mean temperature was above normal, current week mean temperature is going to be above normal, and normal mean temperature is predicted during the upcoming week.
- Previous week mean temperature was above normal, current week mean temperature is going to be normal, and normal mean temperature is predicted during the upcoming week.
- Previous week mean temperature was normal, current week mean temperature is going to be above normal, and normal mean temperature is predicted during the upcoming week.
- Previous week mean temperature was below normal, current week mean temperature is going to be normal, and below normal mean temperature is predicted during the upcoming week.
- Previous week mean temperature was above normal, current week mean temperature is going to be normal, and below normal mean temperature is predicted during the upcoming week.
- Previous week mean temperature was normal, current week mean temperature is going to be below normal, and below normal mean temperature is predicted during the upcoming week.
- Previous week mean temperature was below normal, current week mean temperature is going to be below normal, and below normal mean temperature is predicted during the upcoming week.
- Previous week mean temperature was above normal, current week mean temperature is going to be above normal, and below normal mean temperature is predicted during the upcoming week.
- Previous week mean temperature was normal, current week mean temperature is going to be above normal, and below normal mean temperature is predicted during the upcoming week.
- Previous week mean temperature was normal, current week mean temperature is going to be normal, and below normal mean temperature is predicted during the upcoming week.
- Previous week mean temperature was above normal, current week mean temperature is going to be below normal, and below normal mean temperature is predicted during the upcoming week.
- Previous week mean temperature was below normal, current week mean temperature is going to be above normal, and below normal mean temperature is predicted during the upcoming week.

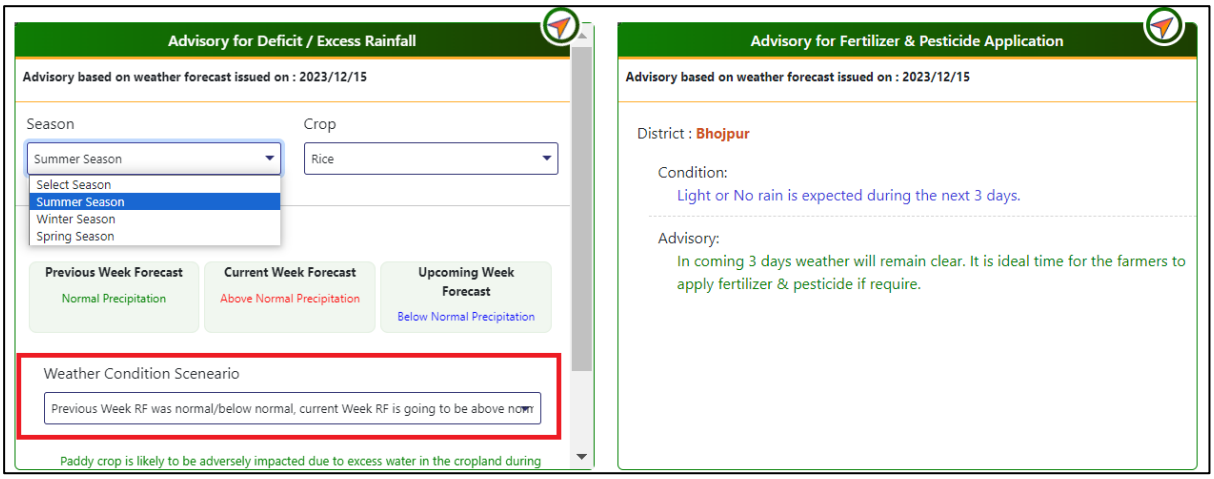


Figure 16: Selection of weather condition scenario in advisory for deficit or excess rainfall

After selecting the weather condition scenario, the crop and season specific advisory for deficit/excess rainfall will be generated in the space below this drop-down menu. The admin can send this advisory to all the users by email by tapping the send button as discussed in the previous section.

4.6 Advisory for fertilizer and pesticide application

The application for fertilizer and pesticides are solely depends on occurrence of upcoming rainfall. If a sudden rainfall happens within a few days after the application, all the fertilizer and pesticides will be washed away and it will cause a financial loss to the farmer. Hence the 3-day weather forecast is very useful for determining the application of fertilizer and pesticides. Hence, the advisory for the application of fertilizer and pesticides based on 3-days weather forecast has been developed ad indicated in Figure 17. It will automatically generate based on season and 3-day weather forecast and admin can send this advisory to all the users by email by tapping the send button as discussed in the previous section.

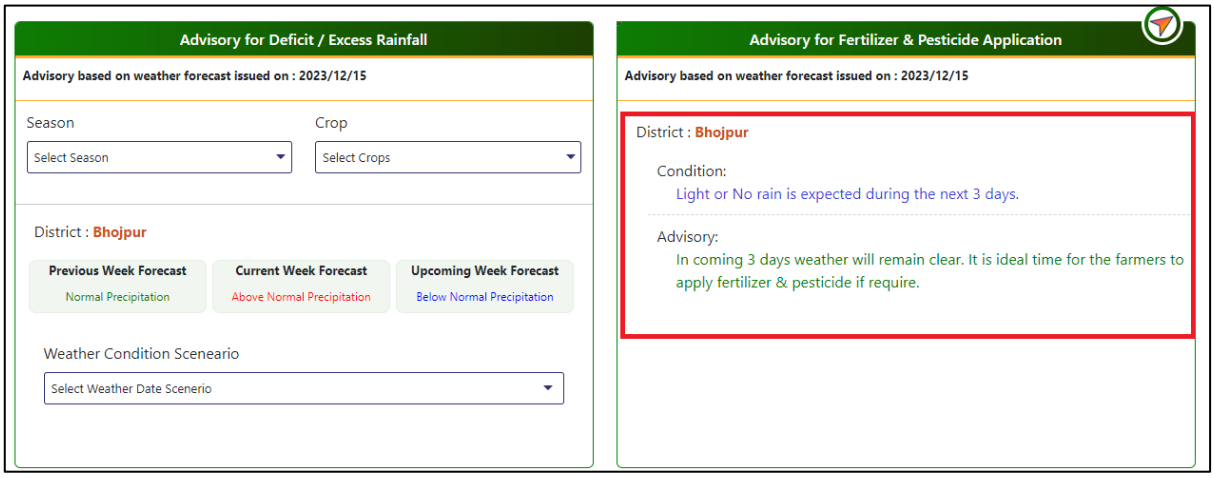


Figure 17: Advisory for fertilizer and pesticide application

4.7 Advisory for pest and disease infestation

The advisory for pest and disease infestation has been developed based on current weather condition and weather forecast as shown in Figure 18. The congenial weather condition for the occurrence of pest and diseases have been identified and incorporated in this advisory. The season specific advisory has been incorporated in this option for summer, winter and spring seasons for multiple crops such as rice and maize for summer season, wheat and potato for winter season and maize for spring seasons. The user can select the respective season and crop and automatically the advisory will be generated below based on current weather condition and weather forecast. The admin can send this advisory to all the users by email by tapping the send button as discussed in the previous section.

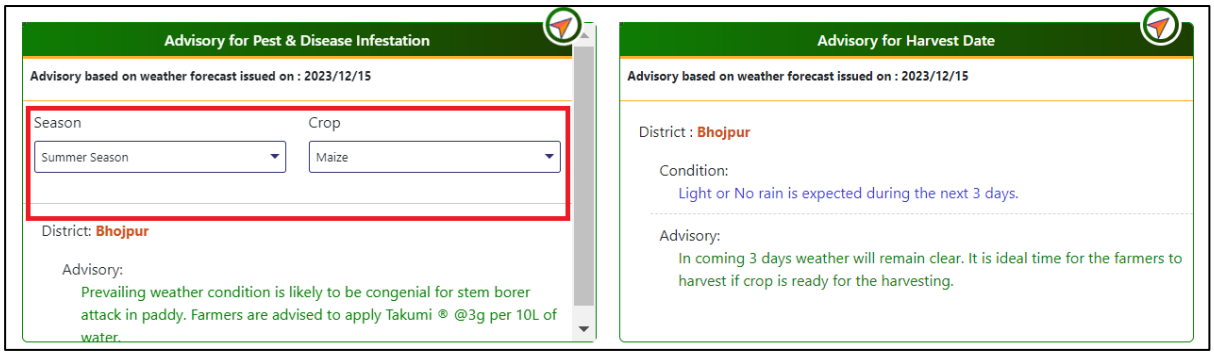


Figure 18: Advisory for pest and disease infestation

4.8 Advisory for harvest

The crop harvest is very much weather dependent because, avoiding rain during harvest is essential for many crops to prevent damage and maintain quality. Hence the 3-day weather forecast is very useful for determining the crop harvest. Therefore, the advisory for the harvest based on 3-days weather forecast has been developed ad indicated in Figure 19. It will automatically generate based on season and 3-day weather forecast and admin can send this advisory to all the users by email by tapping the send button as discussed in the previous section.

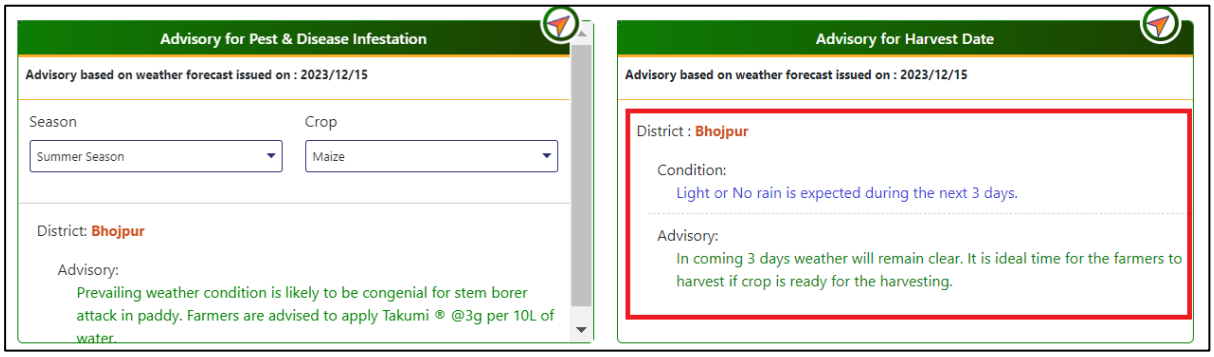


Figure 19: Advisory for harvest

4.9 Advisory for post-harvest

The weather forecasts are essential for effective crop storage after harvesting, enabling farmers to implement strategies that preserve the quality of the crops, prevent spoilage, and mitigate the risks associated with environmental factors. The weather forecast help for crop storage in many ways such as maintaining optimum ambient temperature and humidity levels, preventing condensation, pest control, ventilation, energy efficiency and so on. Hence advisory for post-harvest has been developed based on 3-days weather forecast and presented in Figure 20.

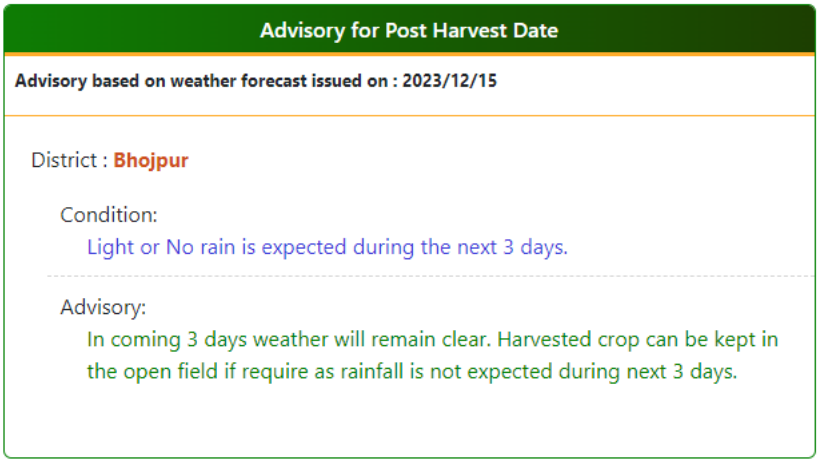


Figure 20: Advisory for post-harvest

4.10 Climate Map

The spatial maps of precipitation, maximum temperature, and minimum temperatures over Nepal during annual and monsoon (June-October) seasons have been prepared and presented in Figure 21. The user can click on desired map and thereby an enlarged vision of it will be available. The link to access these maps is placed in the main panel of this API and immediate after the link to agro-met advisory.

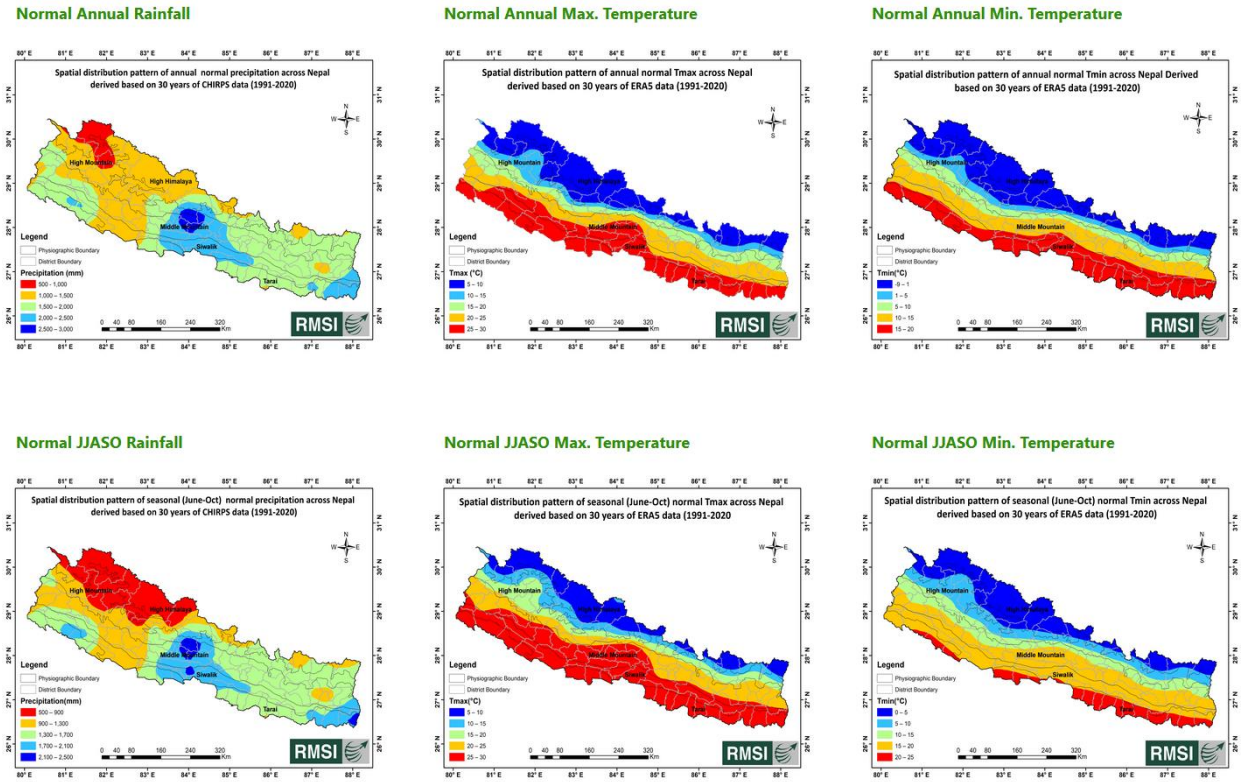


Figure 21: Spatial maps of precipitation, maximum temperature, and minimum temperature over Nepal during annual and monsoon seasons

4.11 Cropping Calendar

The cropping calendar for all the major crops for all the districts during all the major three seasons in Nepal have been prepared as presented in Figure 22. The season specific crop calendars have been incorporated in this option for summer, winter and spring seasons for multiple crops such as rice and maize for summer season, wheat and potato for winter season and maize for spring seasons. The link to access these maps is placed in the main panel of ICWFDS and immediate after the link to weather maps. These calendars have been prepared by conducting comprehensive literature review. The user can select the desired province from the first drop down menu and thereby all the districts falling in that province will be listed in the second one. Then the user can select the desired district, season and crop, and thereby the respective crop calendar will be displayed in the panel placed below.

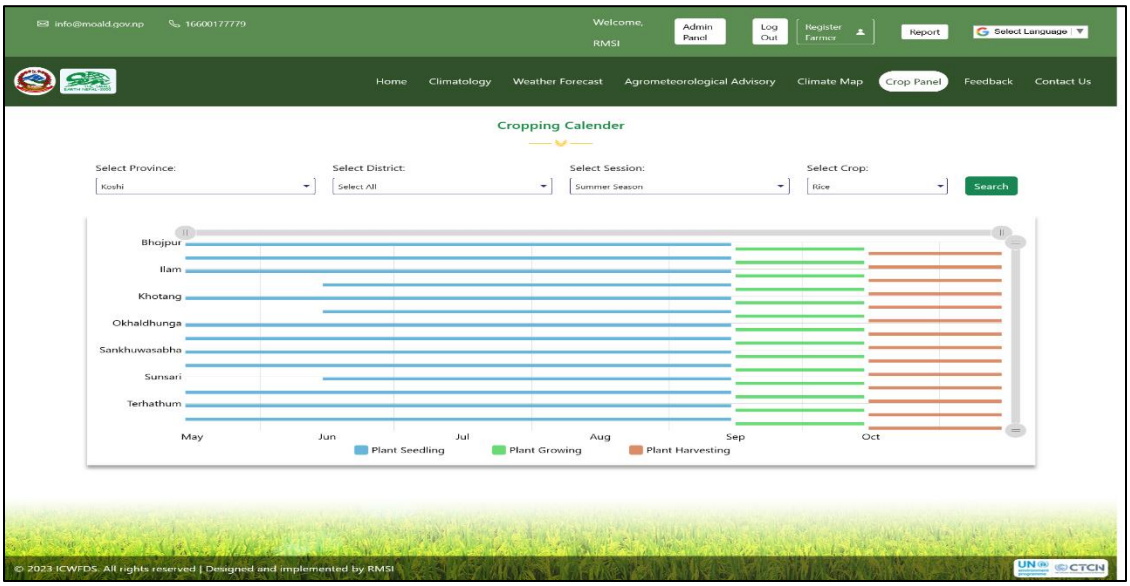


Figure 22: Cropping calendar for all the districts, seasons and crops

4.12 Feedback form

The users are encouraged to submit their feedback and concerns about this API. The feedback form is available by tapping the respective link placed in the main panel. A feedback form will be opened as displayed in Figure 23. The user can enter the full name, mobile number, subject, email address and finally a detailed message about the concern/doubt/feedback. After filling the required fields, the user can click on submit form. A token number will be generated and an email will be sent to the administrator about the submitted feedback. The user can submit their message in either English, Hindi or Nepali languages. The status of all the feedbacks by the users will be available in the bottom of the feedback form as shown in Figure 24.

The user can regularly interact with the administrator until to get the resolution of the feedback. The status of the feedback will be displayed in the far-right side of the panel as not seen, pending, resolved and rejected. The status of the message will be showed as “Not seen” until the administrator notices the message. If the administrator replied and the user is satisfied with the response, the user can change the status as “Resolved”. If the user is not satisfied the response by the administrator, the user can assign the status as “Pending”. If the administrator feels that, the message is not appropriate, then he/she can reject the message and then the status of the message will be displayed as “Rejected”. The user can filter the status of a particular message by applying the respective token number.

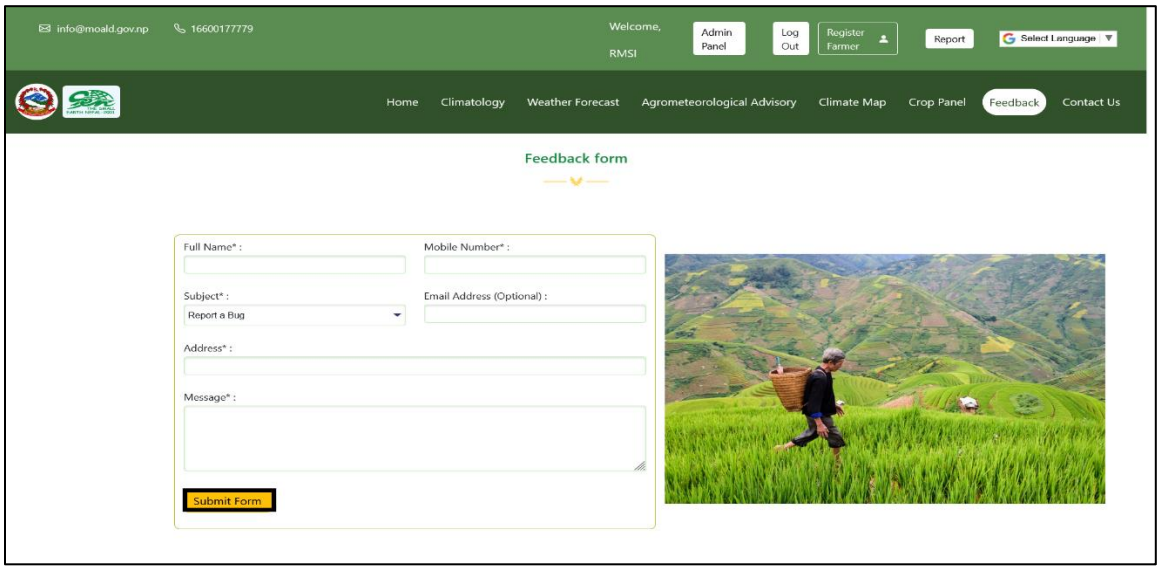


Figure 23: Form to submit feedback and concern about this API

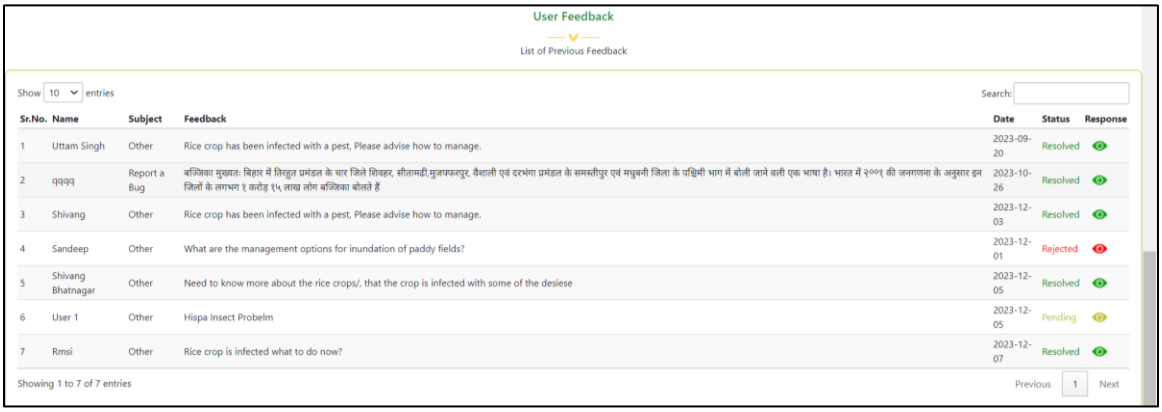


Figure 24: Status of the feedback by the users

4.13 Contact details

The contact details of the authority to be contacted for any types of enquiries of this project has been furnished as shown in Figure 25. The link for it placed at the end of the main panel of ICWFDS.

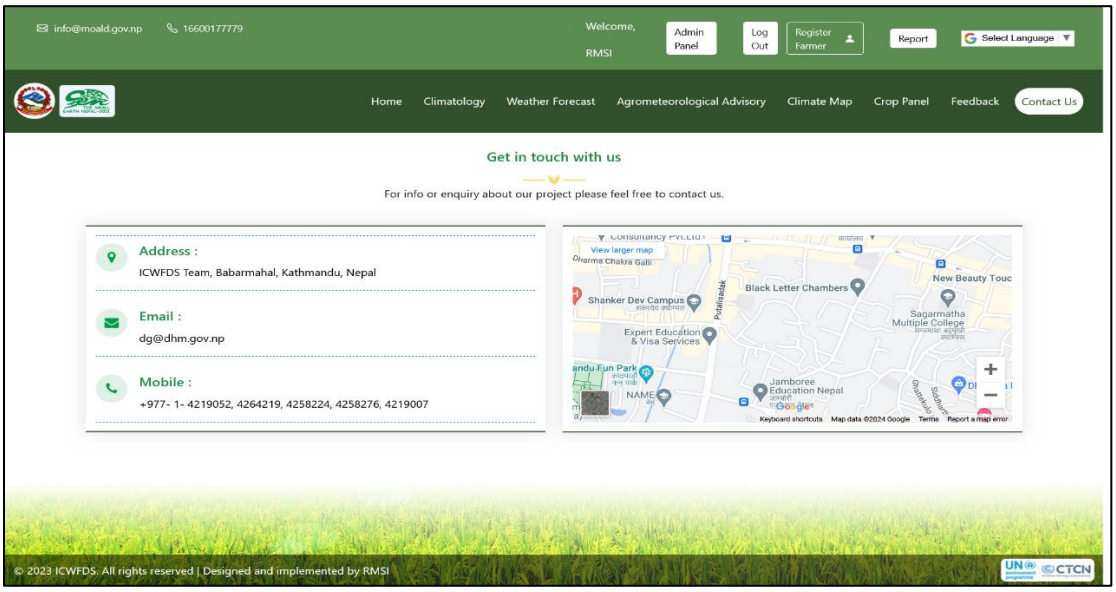


Figure 25: Contact details to any enquiry related to this project

Mr. Shivang Bhatnagar had conducted a detailed demonstration on all the features of ICWFDS and interacted with the participants. He had made the live demonstration of how to submit feedback and response by the email. He sent the various advisories to the email of the few participants and they confirmed the reception of the same. He informed them that all the advisories by ICWFDS will be received by the users through email, WhatsApp, and SMS automatically. He demonstrated the procedure for submitting feedback form and their status by submitting the sample messages and the users are satisfied with it. Finally, he sent the sample advisories to the selected participants by email, SMS, and WhatsApp and the participants confirmed the reception of the same. It indicates that, ICWFDS is functioning successfully with all of its features at this location. The photograph of the workshop and testing of API at Malangwa have been furnished in Figure 26.

Figure 26: Photographs of the workshop and API testing at Malangwa, Sarlahi district situated in Tarai plains of Nepal

The RMSI team interacted with the participants till 05.30 PM (NPT) and clarified all of their queries and the participants were satisfied with the workshop and API as well as the interactions. The participants provided good feedback on the API and their feedback are furnished in Annexure-3.

5 Day 3 (04th December 2023)

Th RMSI team started from Malangwa by 09.00 AM on 04th December 2023 to the second location named Rainas Municipality which is situated in Lamjung district in Central Nepal. This location represents the Middle Mountains region in the country. The team started by road from Malangwa to Lamjung through Hatauda-Mugling-Dumre route and the total distance for this journey was 305 kilometers. The national expert, Dr. Sujata Tamang joined with the team from Mugling and together we proceeded to the Rainas Municipality. The team arrived at the destination by 07.00 PM (NPT) and stayed at Hotel Rijan at Rainas municipality.

6 Day 4 (05th December 2023)

The team along with national expert Dr. Sujata Tamang, reached Rainas Municipality Centre by 09.30 AM (NPT) which was the venue of the workshop and API testing. The team made the initial arrangements for the workshop and API testing. By 10.00 AM (NPT) all the invited participants have arrived at the venue.

The total number of participants was 40 which is found to be overwhelming response of the local farming community and government officials for this program. The details of these participants are furnished in Annexure-2.

The registration processes were completed by 11.30 AM and the meeting started with the self-introduction by the participants. It is followed by the brief introduction about the workshop and API testing by Dr. Sujata Tamang.

Thereafter, Dr. Sandeep VM, the team member of RMSI, explained the major objectives of this present assignment and the importance of the API for the dissemination of advisories based on three-day weather forecast. He explained the weather and climatic features of Nepal and the past and future climate scenarios of the country. He briefed the impact of climate change and weather aberrations on different sectors in Nepal. He also explained the weather observation system and its importance in Nepal. He briefed different types of weather forecasting services and their significance and applications. Then he explained about the Department of Hydrology and Meteorology (DHM), which is the agency providing weather related services in the country and its various types of services and their uses in different sectors. Finally, he briefed the importance of the API which was developed as part of this assignment and its usage in disseminating the advisories based on three days weather forecast in Nepal. He also explained the past experience and success stories of RMSI in developing similar kind of applications over various countries in Asia and Africa.

The live demonstration and testing of API has been conducted by Mr. Shivang Bhatnagar who is the key developer of API. He started with the major features of API. He explained about all the pages and features. He started with the introduction, followed by climatology, weather forecast and weather maps. Then he given a detailed explanation about agro-met advisory section such as, how to generate the agro-met advisory, how to select different options in different categories and how to send these advisories to the users. He also explained how to change the features of advisories by the administrator. He explained how to register a farmer and how to submit feedback and interact with the administrator. He explained how these advisories are received by email. He demonstrated the reception of these services by email with the selected participants of the workshop and they confirmed the receipt of the advisory. He also demonstrated how these advisories are received automatically through SMS and WhatsApp. He tested the dissemination of these services through SMS and WhatsApp with the participants of the workshop and they confirmed the receipt of the message through these manners. It indicates that, this API is functioning successfully with all of its features at this location. The photograph of the workshop at Rainas Municipality have been furnished in Figure 27.

Figure 27: Photographs of the workshop and API testing at Rainas Municipality, Lamjung district situated in middle mountain of Nepal

The team interacted with the participants till 05.30 PM and clarified all of their queries. The participants provided good feedback on the API and their feedback are furnished in Annexure-3.

After that, the RMSI team started from Rainas Municipality for Kathmandu by road through Dumre-Mugling route and the total distance of this journey was around 160 kilometers. The team arrived at Kathmandu by 12.00 AM on 06th December 2023 and stayed night at Airport Hotel, Kathmandu.

7 Day 5 (06th December 2023)

The RMSI team started from Airport Hotel, Kathmandu by 08.00 AM (NPT) to Thribhuvan International Airport, Kathmandu. Then they travelled by air from Kathmandu to Biratnagar by Buddha Air (U4 703). The flight departed from Kathmandu at 09.40 AM (NPT) and arrived at Biratnagar Airport at 10.30 AM (NPT). The National expert Dr Rajendra Uprety joined with RMSI team from Biratnagar Airport. The RMSI team along with the national expert started from Biratnagar Airport by 11.30 AM (NPT) to the third and final location of the workshop and testing of API named Bhojpur in Bhojpur district. This location is situated in eastern Nepal and represents mid-hills regions. The team travelled by road through Biratnagar-Itahari-

Dharan-Dhankuta-Hile route arrived Bhojpur at 08.30 PM (NPT). The total distance of this journey was 195 kilometers. The team stayed at Hotel Vintuna in Bhojpur in the night.

8 Day 6 (07th December 2023)

The team along with national expert Dr. Rajendra Uprety, reached Agriculture Knowledge Centre at Bhojpur by 09.00 AM (NPT) which was the venue of the workshop and API testing. The team made the initial arrangements for the workshop and API testing. By 09.30 AM (NPT) all the invited participants have arrived at the venue. The total number of participants was 30 and which is found as an excellent representation of farming community over this region. The details of these participants are furnished in Annexure-2. The registration processes were completed by 11.00 AM and the meeting started with the self-introduction by the participants. It is followed by the brief introduction about the workshop and API testing by Dr. Rajendra Uprety.

Thereafter, Dr. Sandeep VM, the team member of RMSI, explained the major objectives of this present assignment and the importance of the API for the dissemination of advisories based on three-day weather forecast. He explained the weather and climatic features of Nepal and the past and future climate scenarios of the country. He briefed the impact of climate change and weather aberrations on different sectors in Nepal. He also explained the weather observation system and its importance in Nepal. He briefed different types of weather forecasting services and their significance and applications. Then he explained about the Department of Hydrology and Meteorology (DHM), which is the agency providing weather related services in the country and its various types of services and their uses in different sectors. Finally, he briefed the importance of the API which was developed as part of this assignment and its usage in disseminating the advisories based on three days weather forecast in Nepal. He also explained the past experience and success stories of RMSI in developing similar kind of applications over various countries in Asia and Africa.

He handed over the baton to Mr. Shivang Bhatnagar who is the key developer of API. He started with the major features and all the pages of API. He started with the introduction, followed by climatology, weather forecast and weather maps. Then he given a detailed explanation about agro-met advisory section such as, how to generate the agro-met advisory, how to select different options in different categories and how to send these advisories to the users. He also explained how to change the features of advisories by the administrator. He explained how to register a farmer and how to submit feedback and interact with the administrator. He explained how these advisories are received by email. He demonstrated the reception of these services by email with the selected participants of the training program and they confirmed the reception of the advisory. He also demonstrated how these advisories are received automatically through SMS and WhatsApp. He tested the receipt of these services through SMS and WhatsApp with the participants of the workshop and they confirmed the receipt through these manners. It indicates that, this API is functioning successfully with all of its features at this location. The photograph of the workshop at Bhojpur have been furnished in Figure 28.

Figure 28: Photographs of the workshop and API testing at Bhojpur situated in Mid hills of Nepal

The team interacted with the participants till 04.30 PM and clarified all of their queries. We received good feedback from the participants as furnished in Annexure-3. After the workshop, RMSI team started from Bhojpur for Biratnagar by road through Hile-Dhankuta-Itahari route and the total distance of this journey was around 195 kilometers. The team arrived at Biratnagar by 12.30 AM on 08th December 2023 and stayed night at Hotal Harrison Palace, Biratnagar.

9 Day-7 (8th December 2023)

The RMSI team started by road from Hotel Harrison Palace, Biratnagar by 11.00 AM (NPT) to Bogdogra International Airport, West Bengal, India. The team travelled through Biratnagar-Kakarbhitta road and arrived Bagdogra airport by 02.00 PM (IST). Then they departed from Bagdogra by air at 06.10 PM (IST) and arrived at Delhi at 20.30 PM (IST) by Air India Express I5-766. Finally, the RMSI team reached back after a successful testing as well as training and demonstration of API named ICWFDS for the dissemination of advisory based on 3-day weather forecast at all the selected 3 locations in Nepal.

10 Annexure-2

10.1 List of Participants in the training program on ICWFDS held in Malangawa, Sarlahi District, Nepal on 3rd December 2023

(03-Dec-2023) Training → Sunday → Sarlahi (Malangawa)

Customized weather and climate information system for climate-resilient agricultural system in Nepal

Sr. #	Date	Name	Organization & Address	Mobile No.	Email	Signature
1		Nisma Pandit	Kabalashi, Pipariya-9	9809659896		Nisma
2.		Ritika Sah	Kabalashi 10, Salempur	9745853262		Ritika
3.		Radha Kumari Mahato	Malangwa-2	9809600135		Rad
4		Manoj Mahto	Malangwa-3	9827892588		Manoj
5		Chulihiya paswan	Kaudena-3	9826849629		लालिमा
6.		Shanti Mahato	Bhediyahi-1	9819855278		शान्ति
7		[illegible]	[illegible]	9854040059		
8		Bikash Gautam	Kaudena-8	9819813406		

Attendance sheet

Customized weather and climate information system for climate-resilient agricultural system in Nepal

Sr. #	Date	Name	Organization & Address	Mobile No.	Email	Signature
9	2078/08/	Krishnanandan Yadav	chakraghatta-05 padariya	9866418857	officialkky57@gmail.com ~~officialkky...@gmail.com~~	Krishnanandan
10	078/08/	Amit kumar Sah	chakraghatta-5 padariya	9845000771	cosep2068@gmail.com	[signature]
11	2080/08/17	BINOD KUMAR RAY	KAUDEN : 5	9801676620	BINODYADAV@GMAIL.COM	[signature]
12	2080/08/17	Jitendra Kumar Das	chakraghata-8	9844584854	jitendradas864@gmail.com	[signature]
13	2080/08/14	Manoj kumar yadav	kabilasi-03	9840862158	manojyadav3@gmail.com	[signature]
14	2080/08/17	Ramnandan Yadav	Chakraghata-9	9807622226	—	[signature]
15	2078/8/17	Ram kewal Ray	chakaraghata-6	9746633847	-	[signature]
16	2078/8/17	Budhilal Mahat	नजगावा-6 Malazgwa-7	९८०४२९२३२९ ९६४४३६९८९८ 9744369898		Budhilal Mahato

Attendance sheet

Customized weather and climate information system for climate-resilient agricultural system in Nepal

Sr. #	Date	Name	Organization & Address	Mobile No.	Email	Signature
17	2080/08/11	UMESH YADAV	KAUDENA	9812049892		
18	2080/08/11	Gyanendra Kumar Yadav	Bodhabariya-5	9846776095		
19		MANOJ RAY	BARHARI	9827825867		
20		[illegible]	[illegible]	9827659352		
21		[illegible]	[illegible]	9864016608		
22		[illegible]	[illegible]	9864214188		
23		[illegible]	[illegible]	9817640474		
24		[illegible]	[illegible]	9817640 / 9862900995		

Attendance sheet

Customized weather and climate information system for climate-resilient agricultural system in Nepal

Sr. #	Date	Name	Organization & Address	Mobile No.	Email	Signature
	25	SHUSHIL Kumar mahato	Chakraghatta -7	9845529584	sahanisushil 8058 gmail.com	
	26	PREM KUMAR MAHATO	"	9861432265	-	
	27	Narendra prasad patel	Krishi Gyan kendra Sarlahi	9865501596	-	
	28	Alpana shah	Krishi Gyan Kendra, Sarlahi	9844003843	alpanashah 2012@gmail.com	
	29	Raushan Ray yadav.	Kaudena ga.pa (4) Motipur. Sarlahi	9844248373		

Attendance sheet

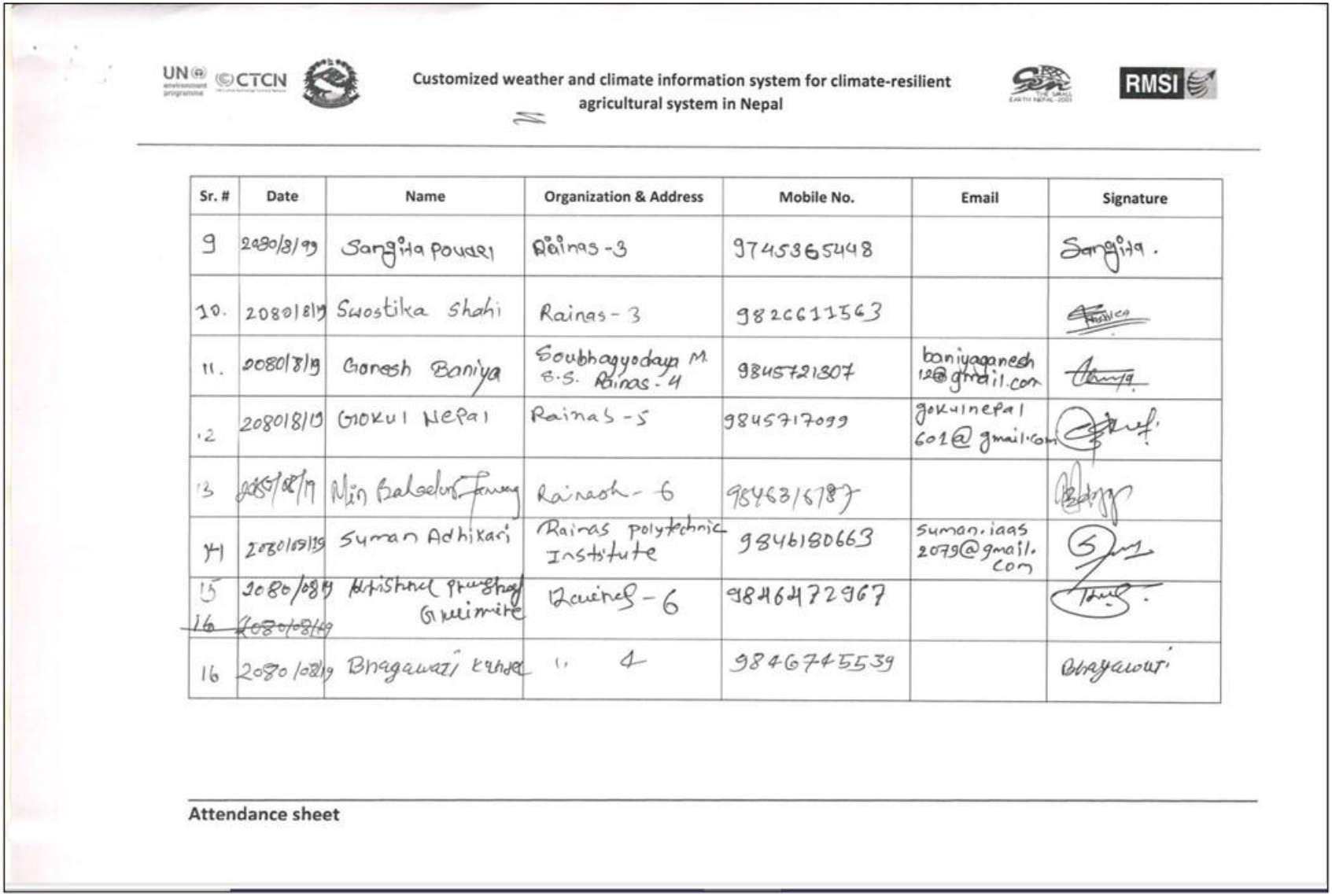
10.2 List of Participants in the training program on ICWFDS held in Rainas Municipality, Lamjung District, Nepal on 5th December 2023

Date :- 05-Dec-2023 (Tuesday) -> Lamjung (Rainas)

Customized weather and climate information system for climate-resilient agricultural system in Nepal

Sr. #	Date	Name	Organization & Address	Mobile No.	Email	Signature
1	2080/8/19	Manisha Shahi Giri	Rainas-8 Majhigau	9813038366		
2	2080/8/19	Paja Pandey	Rainas-6 Pachuai	9846506108		Paja
3	2080/8/19	Parbati Ram Dhakal	Rainas-6 Dhamilikuwa	9841631871		
4.	2080/8/19	Sita Basaula	Rainas 6 Dhamilikowa	9846181653		
5	2080/8/19	Sochana Laudari	Rainash Dhamilikowa	9846353875		
6.	2080/8/19	Panchu Maya Tamang	Rainash-6 ~~Shyalet~~	9808386634		Panchu
7	2080/8/19	Shanta Kandel	Rainas-5 Tinpipla	9817117900		
8.	2080/8/19	Jyoti Ramtel	Rinas - 7 Garambe Sthi	9826157648		

Attendance sheet



Customized weather and climate information system for climate-resilient agricultural system in Nepal

Sr. #	Date	Name	Organization & Address	Mobile No.	Email	Signature
9	2080/8/19	Sangita Powari	Rainas-3	9745365448		Sangita.
10.	2080/8/19	Swostika Shahi	Rainas-3	9826611563		
11.	2080/8/19	Ganesh Baniya	Soubhagyodaya M.S.S. Rainas-4	9845721807	baniyaganesh128@gmail.com	
12	20801819	Gokul Nepal	Rainas-5	9845717099	gokulnepal601@gmail.com	
13	2080/8/19	Min Bahadur Tamang	Rainash-6	9846316787		
14	2080/08/19	Suman Adhikari	Rainas polytechnic Institute	9846180663	suman.iaas2079@gmail.com	
15	2080/08/19	Krishna Prasad Ghimire	Rainas-6	9846472967		
~~16~~	~~2080/08/19~~					
16	2080/08/19	Bhagawati Khadka	1. 4	9846745539		Bhagawati

Attendance sheet

Date :- 05/Dec/2023 (Tuesday)

Customized weather and climate information system for climate-resilient agricultural system in Nepal

Sr. #	Date	Name	Organization & Address	Mobile No.	Email	Signature
23	2080-8-19	Prakash Raj Paudel	Rainas Municipality / C.A.O.	9848302362	rainasmunicipality.2@gmail.com	P. R. Paudel
24	"	Chandika Adhikari	1	9816358523		
25	2080-8-19	Bibek Bhatta	Rainas-5, Student	9866423217	Bibek.sudarshan101@gmail.com	
26	"	Shree Krishna Poudel	Rainas 3	9856088828	Poudel Shree krishna65@gmail.com	
27	2080-8-19	Kumar Gurung	Rainas-9	9846191839		
28	2080-08-19	Samip Gurung	Rainas-9	9849841474		
29	2080-8-19	Parambir Adhikari	Rainas-4	9846609074	adhikari.parambir@gmail.com	
30	"	Bishnu Khadka	Rainas-4	9846358923	—	

Attendance sheet

Customized weather and climate information system for climate-resilient agricultural system in Nepal

Sr. #	Date	Name	Organization & Address	Mobile No.	Email	Signature
31 9.	2080/9/18	Ramchendra Mishre	ward 7	9806799014		[signature]
32 10.	2080/8/18	Buddhi Raj Bhatta	Rainas - 2	9846403190	bhattabuddhi@gmail.com	[signature]
33 11.	2080/08/18	Narayan Sen Thakuri	Rainas 2	9807831342		[signature]
34 12.	2080/08/18	Manoj B.K.	Rainas - 9	9805108960	-	[signature]
35 13	2080/08/19	Yubaraj Magarkoti	Rainas - 5	9843623554	bibas.magarkoti@gmail.com	[signature]
36 14	2080/08/19	Banik Bhatta	Rainas - 5	9846316662	banikbhatta123@gmail.com	[signature]
37 15	2080/08/19	BabuRamShrestha	Rainas 5	9868277285	baburamshrestha@gmail.com	[signature]
38 16	2080/08/19	Bishnu Bahadur Kadariya	Rainesh - 8	9846860325	kadariyabishnu254@gmail.com	[signature]
39.	2080/08/19	Surendra Gurung	Rainesh - 10	9843618179	Surengurung3241@gmail.com	[signature]
40.	"	Kisan Adhikari	Rainas	9768418214		[signature]

Attendance sheet

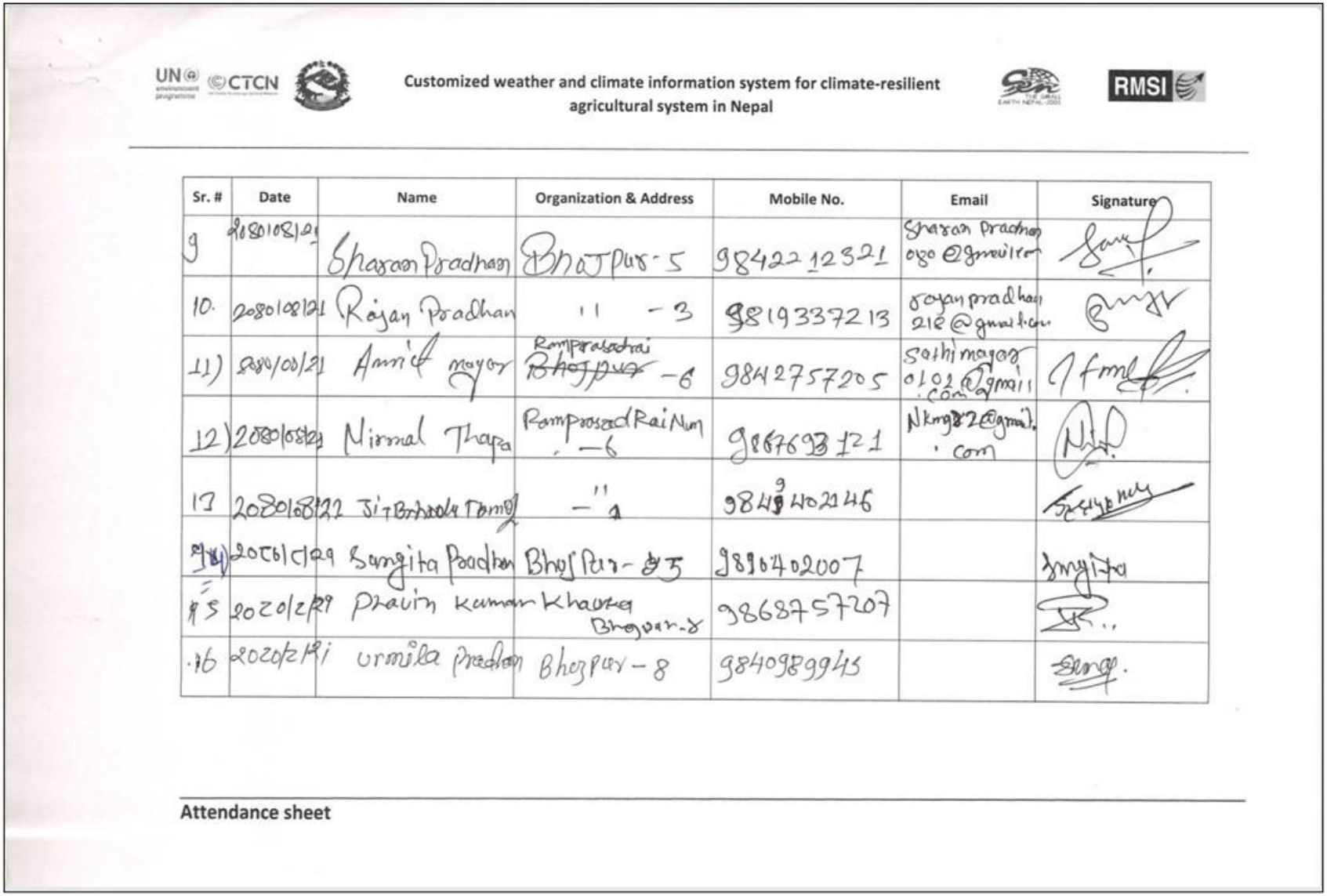
10.3 List of Participants in the training program on ICWFDS held in Bhojpur, Bhojpur District, Nepal on 7th December 2023

Date:- 7th Dec 2023 (Thursday) → Koshi (Bhojpur)

Customized weather and climate information system for climate-resilient agricultural system in Nepal

Sr. #	Date	Name	Organization & Address	Mobile No.	Email	Signature
1	2080/08/21	Pratiksha shrestha	Bhojpur-5	9840557474	stha pratiksha 12@gmail.com	[signature]
2	"	Yooshika Thapa	Arun-4	9863717800	yooshikathapa @gmail.com	[signature]
3		Sunila chauhan	Ramprasadrai-5	9863671413	sunilacha 442@gmail	[signature]
4		Kabita Rai	Ramprasadrai-7	9843916453	Kabita Rai	Kabita
5		Phabindra Pradhan	Bhojpur-5 Singha Sahinwa(?) farm	9842085922	Phabindrapra12 @gmail.com	[signature]
6		Deepa Pradhan	Bhojpur-4 Dawom.	9819023678	Deepa Pradhan @878 gmail.com	[signature]
7		Nawaraj Baniya	Ramprasad rai-3 Bhulke	9749201609	nawarajbaniya 12345@gmail.com	[signature]
8	"	Dev Chandra Rai	Bhojpur-M.10	9842122492	Dev.Banfawa73@gmail.com	[signature]

Attendance sheet



Customized weather and climate information system for climate-resilient agricultural system in Nepal

Sr. #	Date	Name	Organization & Address	Mobile No.	Email	Signature
9	2080108121	Sharan Pradhan	Bhojpur-5	9842212321	Sharan pradhan 080@gmail.com	
10.	2080108121	Rajan Pradhan	" -3	9819337213	rajanpradhan 218@gmail.com	
11)	2080/08/21	Amrit mayor	Ramprasadrai Bhojpur -6	9842757205	Sathimayor 0101@gmail.com	
12)	2080/08/21	Nirmal Thapa	Ramprasad Rai Nun -6	9867933121	Nkmg82@gmail.com	
13	2080/08/22	Jit Bahadur Tamang	-" 1	9849402146		
14)	2080/08/29	Sangita Pradhan	Bhojpur-5	9804702007		
15	2080/08/29	Pravin kumar Khawas	Bhojpur-8	9868757207		
16	2080/08/29	urmila pradhan	Bhojpur-8	9840989945		

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Customized weather and climate information system for climate-resilient agricultural system in Nepal

Sr. #	Date	Name	Organization & Address	Mobile No.	Email	Signature
17	२०८०/८/२१	Menuka Khadka	BHOJPUR, ८	९८६१९४०९०५		[signature]
18	२०८०/०८/२१	Kaushila Bista	PMAMP. Bhojpur	9852088900	pmamp.piu.bhojpur@gmail.com	[signature]
19.	2080/08/21	Junita Rai	PMAMP. Bhojpur	9852077376	pmamp.piu.bhojpur@gmail.com	[signature]
20	080/08/21	Ganesh Khatri	AKC Bhojpur	9852062130	ganeshkhatri889@gmail.com	[signature]
21	80/8/21	Yogendra Rai	"	9857623610	Raiyogendra113@gmail.com	[signature]
22	2080/8/21	Tek Bdr. Karki	AKC Bhojpur	9862673718	karkitek909 gm.	[signature]
23	2080/08/21	Subash Dahal	Agriculture Knowledge centre, Bhojpur	+9779862160720	subashdahal720@gmail.com	[signature]
24	2080/08/21	Gita Pahadi	Bhojpur-8	9844009416	pahadigita922@gmail.com	[signature]

Attendance sheet

Customized weather and climate information system for climate-resilient agricultural system in Nepal

Sr. #	Date	Name	Organization & Address	Mobile No.	Email	Signature
25,	080/08/21	Amrita Bhujel	Bhojpur Municipality	9814359592	—	
26	080/08/21	Bhupal Pandey	Bhojpure. m.8	9849635427	Bhupal Pandey 369@G. com	
27	080/08/21	Resina Nepali	Bhojpur m.-7	9800944962	resi.nepali 34@gmail.com	
28.		Tirtha Bdr. Tamang	BhojAKC, Bhojpur	9842099817		
29		Mahendra Neupane	Bhojpur 5	9862949675		
30.		prem Kr. Tamang	Bhojpur-9	9842546722		
31.						
32.						

Attendance sheet

11 Annexure-3

11.1 Feedback from the Participants for the training program on ICWFDS held in Malangawa, Sarlahi District, Nepal on 3rd December 2023

Sunday → Sarlahi (Training) ①

Date: 03-Dec-2023

SR.NO	NAME	FEEDBACK OF THE TRAINING & TRAINEES
1	Narendra pd. patel	- This app is good for farmer for agriculture cultivation. Farmer can cultivate agriculture practice according season.
2.	Ram nath Yadav	This training and trainees better
3	Manoj kumar yadav	This apps is good for ~~peoples~~ cultivation lead for peoples farmer.
4	Jitendra das	ये कार्यक्रम बहुत अच्छा लगा और Apps लागु होना चाहिए,. बहुत अच्छा कार्य कार्यक्रम है

(2)

Date :

SR.NO	NAME	FEEDBACK OF THE TRAINING & TRAINEES
१	सुशील कुमार महतो	हमको तालीम बहुत अच्छा लगरहा है।
२	प्रेम कुमार महतो	हम को आपका बातें का तरिक अच्छा लगा
३	श्याम किशोर महतो	सिखाने वाला काम बहुत अच्छा है
४	विकाउ लाल कवार	यह तालिम से हमलोगों को बहुत अनुभव हुआ है यदि मौसम के कारण से कुछ उत्पादन में कमी होता है
5	Krishanandan Yadav	
6	Amit . P.d.S	How we farming unseason farming in different season., different farming.

Date :

3

SR.NO	NAME	FEEDBACK OF THE TRAINING & TRAINEES
1	Alpana shah	It's good to farmers to know about wheather. we are very thankful to you for your guidlines.
2	Raushan Ray yadav	~~This~~ We are so satisfied and its best for farmer. We are better understand by them. ~~We are~~
3	Nirma Pandit	It's good to farmer's to know about wheather.
4.	Ritika Sah	It is good to farmers to know about wheather. we are very thankful.
5	राधा कुमारी महतो	हमें ~~●~~ ज्यादा लगा मौसम बारेमें समय कब-कब मौसम बदलाव है आप बताए।
6	मनोज महतो	हमें मौसम को बारेमें सिखाइ अरु बातचीत SMS मे म्यासेज लिखकर मौसमको बारेमा जानकारी

(5)

Date :

SR.NO	NAME	FEEDBACK OF THE TRAINING & TRAINEES
	आज का कार्यक्रम	बहुत आछा लगा है
	[illegible]	[illegible]
	आज के कार्यक्रम	बहुत आछा लगा है
	[illegible] कुमारी	[illegible]
	शान्ती महतो	मौसम बारीस बदलाव बारेमे हमे ~~आछा~~ आछा लगा है।
	चुलहीया पासवान	हमे आछा लगा है।

11.2 Feedback from the Participants for the training program on ICWFDS held in Rainas Municipality, Lamjung District Nepal on 5th December 2023

Date: 5 - December - 2023

Sl No	Name	Feedback of the Training
	Balaram Parajuli	This app is very interesting and will help us for learning new technologies.
	Powen DHekal	नई Technology के बारे में जानके अच्छा लगा, मुझे उम्मीद है ये बहुत फाइदेमन्द होगा किसानों [illegible]।
	Prakash Raj Poudel	This app is good.
	Manisha shahigiri	ठिक है!
	Puja Pandey	मैं थोड़ा विलम्ब से आया तो ज्यादा समझ नहीं आया पर सब बोले ठीक है।
	Shanta Kander	अच्छे से समझ आया है। इसलिए बहुत ठीक है।
	Sita Basaula	कार्यक्रम बहुत प्रभावी था।
	Panchu Maya Tamang	This will help the farmers to utilise the resources especially irrigation meaningfully. Thanks for the app.

Date: 5 - December - 2023

Sl No	Name	Feedback of the Training
	Shree Krishna Poudel	This is very interesting and good knowledge
	Kumar Gurung	नया जानकारी जानकर अच्छा लगा रहा
	Samip Gyawaly	कार्यक्रम अच्छा था, बहुत लाभकारी।
	Param Bir Adhikari	Good to know about the app. Very well presented.
	Bishnu Khadka	बारीश बदलाव कारण जानकर आच्छा लाग्यो।
	Ramchendra Mishra	SMS और App से फायदे जानना नया अनुभव था।
	Buddhi Raj Bhatta	Very new and enriching experience.
	Narayan Sen Thakuri	Explanation is good & keen understanding about the app

Date: 5 - December - 2023

Sl No	Name	Feedback of the Training
	Manoj BK	I can't understand in full English. Hindi me बेहतर होता।
	Yubaraj Mayakoti	GOOD !
	Bairk Bhatta	कार्यक्रम अच्छा लगा ।
	Babu Ramshreshtha	बहुत ठीक लगा।
	Bishnu Bar Hadaniya	मजा आ गया । good था।
	Surendra Gurung	हमारी भाषा में होता तो बेहतर होता और भी।
	Kisan Adhikari	ठीक है । आपका तरीका

Date: 5 - December - 2023

Sl No	Name	Feedback of the Training
	Sochana Laudari	In the traning I found helpfull content for us.
	Jyoti Ramtel.	satisfied with the traing.
	sangita poudel	आछा तरीका लगा बोझ्त ।
	Swostika Shahi	बहुत ठीक रास्रो ।
	Ganesh Baniya	नया अनुभव राम्रो ।
	Gokul Nepal	मौसम मे बदलाव App से जानना होगा अच्छा है ।
	Suman Adhikari	Experienca was good
	Min Bahadur Tamang	Great experience and the training was good.

Date: 5 - December - 2023

Sl No	Name	Feedback of the Training
	Krishal Phuyal Gaunimite	very interesting and learned a lot
	Bhagawati Kattel	GOOD TO GO!
	Dr. Bibek Bhattarai	This training is useful farmers.
	Bipana Sirmal	very glad to attend the training
	Bishnu bdr gurunge	किसान के लिए उपयोगी है अच्छा है
	Ganga Basnet	Good to learn from the training.
	Chandira Adhika	~~किसानों~~ के लिए उपयोगी है।
	Bibek Bhatta	Good

11.3 Feedback from the Participants for the training program on ICWFDS held in Bhojpur, Bhojpur District Nepal on 7th December 2023

(Bhojpur)

Date: 07th - Dec - 2023

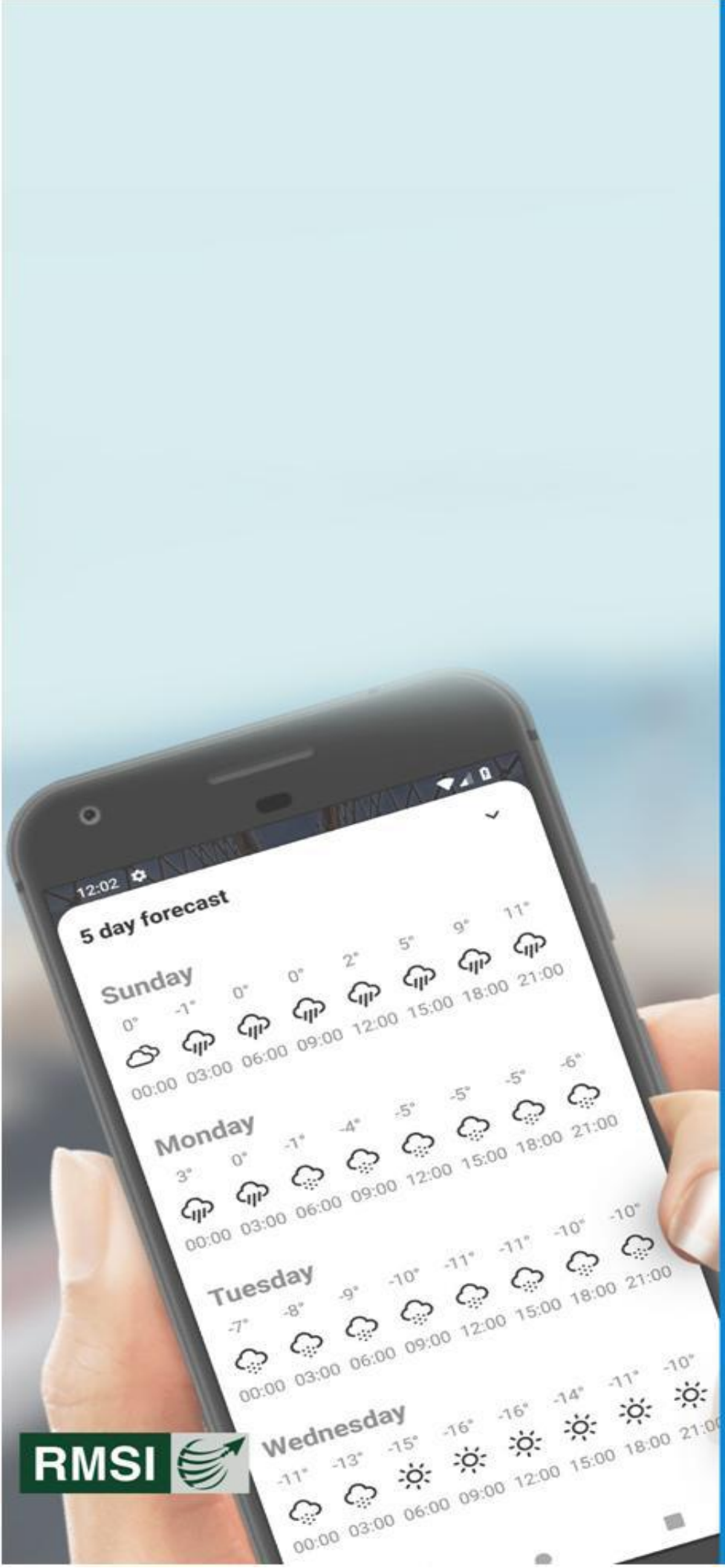
SR.NO	NAME	FEEDBACK OF THE TRAINING & TRAINEES
1	Subash Dahal	portal menus/option should be in local language understanble to farmers. Advisory recomendation must be in local language. It would be better if the advisory contacted the farmers personally.
2.	Asmita Bhujel.	I would like to explane in Hindi. Because I can understanding in Hindi.
3	Bhupal Pandey	It wolus would be better the farmers personally
4.	Kabita Rai	my good two
5	PRAVIN K. KHADKA	good ठिक है। आपना परेका
6	Gita Pahadi	मै सुरु से नही आए तो इसले राम्रो नही बुझेगा
7	Nowaraj Baniya	ठिक छ।

Date :

SR.NO	NAME	FEEDBACK OF THE TRAINING & TRAINEES
8.	Dev Chandra Rai	बहुत ठिक हुवा।
9)	अमृत मगर	यो orientation class धेरै राम्रो थियो। तर अझै धेरै दिन वा अझै बढी class दिएको भए अझै बढी
		प्रभावकारी (effective) हुने थियो। आउँदा दिनहरूमा पनि यस्तो class भयो भने अझै बढी भएको भए हुन्थ्यो।
10)	Nirmal Magar	Training is very useful but if we get more time and more classes for this will be more effective
		for us. Plz. Can you guys add Nepali calender for weather forecast?
11	Sunita Chauhan	बहुत ठिक है
12	Yooshika Thapa	बहुत ठिक है। आपका तरिका

Date :

SR.NO	NAME	FEEDBACK OF THE TRAINING & TRAINEES
13	Deepa Pradhan.	धेरै राम्रो छ आपनो तरिका
14.		It is better to be ~~implem~~ present training materials along with nepali languages (translator).
		PR and facial expression and content delivery action is quite good of trainers.



OFFICES

USA

2400 Camino Ramon, Suite 160
San Ramon, CA 94582

18 East 41st Street Suite 1704
New York, NY 10017

U.K.
5-7 Abbey Court, Eagle Way
Sowton Industrial Estate
Exeter, EX2 7HY

9 Greyfriars Road
Reading, Berkshire, RG1 1NU

CANADA
251,Consumers Road, Suite 1200
North York, Toronto,ON, M2J 4R3

371 Queen Street Suite 400
Fredericton NB
E3B 4Y9

1881 Steeles Avenue W Suite 203
Toronto ON
M3H 5Y4

AUSTRALIA
Suite 3A, Level 3
1C Grand Ave
Camellia, NSW 2142

40, Lime Street,
King Street Wharf,
Sydney, NSW, 2000

8/10,
Burnside Road Ormeau,
QLD, 4208

UAE
E-09, Al Owais Building, PO Box 94570
Rigga Road, Dubai, UAE

INDIA
Noida- Corporate Office
A-8 Sector 16
NOIDA 201 301, India

Hyderabad
Vega, The V, 11th Floor, Right Wing
Plot No.17, Software Units Layout, Madhapur
Hyderabad – 500081

Dehradun
1105, Doon Express Business Park
Opposite Transport Nagar
Subhash Nagar
Dehradun 248002, India