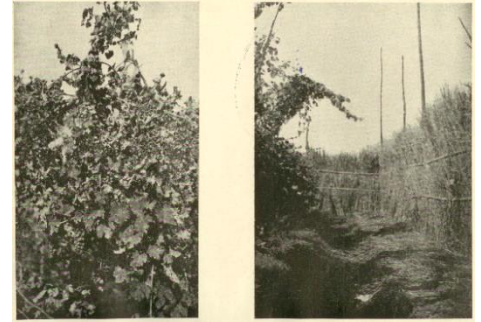


Hill Development



Significant areas in South Asia are in the hilly region and the challenges in providing the services in hills, compared to plain lands, are high. The science of agrometeorology and operational services in particular in plain land were comparatively better position in present days than the hilly region. Within the hilly region there is diversity in weather, diversity in cropping pattern, etc. In the hilly areas, there are number of constrains like slope in the hill, insufficient weather observation, maintenance of observatories, large variation of temperature along the slope within a short distance, frequent extreme weather events, landslides etc. Special attention needs to be taken up to handle these issues in preparation of crop and location specific advisories in hills. There is also need for dense observational network as inadequate observation network still persists in some of the member countries in South Asia Region (SAR).

One important point to take care of in the hills is micro climate-based advisory for which micro climatic studies are a must. Adoption of model villages for pest and disease app development and advisory based on such inputs can also be beneficial as a large portion of produce is lost due to diseases and pests. Studies on modification of microclimate in the crop field and animal houses are very important aspects not only for identifying better management practices of crop for higher productivity, but also for effective management of pests and disease management. It is to be mentioned that there are number of examples area available of controlling insects-pest and diseases through modification of crop microclimate without applying any chemicals.

Here satellite information may serve efficiently. Remote sensing may solve a number of problems under such inadequate infrastructure facilities in hills. Customized agromet products including the satellite products particularly in hilly areas would be useful for providing crop and location specific agromet advisories at very high-resolution scale in hills. Thus, special care would be taken to record the ground observation which are used as a component in preparation advisories for the farmers in the hills. Here satellite information may serve efficiently. The idea of increasing the number of weather stations (at least one rain-gauge and on SSS) to understand local variation of weather and climate in hill areas is essential as weather/climate varies with a very short distance

Because of difficult terrain, dissemination of agro-met advisory is challenging in hills particularly through extension services. Along with the conventional approach and along with mobile phones for dissemination, some innovative approaches in this regard might be thought off e.g., introduction of community radio in dissemination of information in local languages in clusters of villages and capacitate large number of people at community level as it needs minimal cost. Formation of WhatsApp groups of crops specific, block level farmers have also been also useful

Besides, following areas have been taken into consideration to improve the operational agromet advisory services in hills.

1. *Development of forewarning models of pest & diseases is very important in hills. Pest weather relationship studies have not been done sufficiently; however, this aspect is very important to understand behaviour of insect-pests and diseases in relation to prevailing weather conditions. Such understanding would be beneficial for developing useful forewarning models. Developing thumb rule/forewarning models in terms of weather parameters on development of insects-pest & diseases may be very useful for quality agromet advisory services.*
2. *Crop-weather relationship studies have not been done sufficiently till date for different crops in a locality in hills. However, such types of studies are very important not only adoption of better crop management practices for increasing productivity of the crops both in terms of quality and quantity, but also generating quality agromet advisories.*
3. *Identification of the location specific weather hazards/aberrations/extreme events and prepare contingency crop plan according to the prevailing weather constrains in that locality, as well as also by considering experienced/observed changes of weather and climate of the locality.*
4. *Special attention needs to be taken up to handle the diversity in weather, large variation of temperature along the slope within a short distance, frequent extreme weather events, landslides diversity in cropping pattern, etc in preparation of crop and location specific advisories in hills.*
5. *There is need for dense observational network as inadequate observation network still persists in some of the member countries in South Asia Region (SAR). Full utilisation of remote sensing data/information/ products may be explored especially for the unrepresentative area in respect of weather observation for preparation of agromet advisories.*
6. *Development of customized agromet products for hills would be made.*
7. *Development of forewarning models of pest & diseases & crop-weather relationship & promotion of multidisciplinary research in agrometeorology in hills would be made.*
8. *Promotion of micro climate-based advisory based on micro climatic studies would be made.*
9. *Initiative on mutual collaboration to operationalise agromet advisory services in hilly areas of South Asia.*
10. *Micro-level research in hill areas and improvement of weather data collection network.*
11. *Development of forewarning models of pest & diseases in hills for quality agromet advisory services.*
12. *Development of crop-weather relationship studies for different crops in different localities in hills.*