

Assessing the use and benefits of weather and climate information services in Pakistan



The use of weather and climate information services (WCISs) can deliver enormous benefits to society by enabling households, organisations, businesses and governments to make informed decisions that mitigate the impacts of weather and climate and help yield socio-economic benefits to its users. In this context, national meteorological and hydrological services (NMHS), such as the Pakistan Meteorological Department (PMD), have a key role in the production and dissemination of WCISs particularly to those most susceptible to weather and climate such as the farming communities. However, there is limited empirical evidence of how WCISs are currently being used and the benefits of doing so in Pakistan. This study aims to understand the use and benefits of WCISs to farming communities in the Punjab and Sindh provinces in Pakistan in order to help improve the services currently provided by PMD and make WCISs more accurate, reliable, timely and relevant for farmers.

Agriculture and weather and climate information services in Pakistan

Agriculture is one of the dominant sectors of Pakistan's economy, contributing to 22.7% of national GDP and employing 37% of the country's labour force (Government of Pakistan, 2022). Wheat and cotton, the major crops, are often grown together: wheat in the winter, and cotton in the summer. Across Pakistan, this combined production system covers 11.6 million hectares of land, the majority (approximately 76%) of which in the Punjab Province. Wheat and cotton production are highly dependent on weather conditions and face serious challenges from climate variability and change. WCISs can help farming communities make better agricultural decisions as well as help inform policies on the production and management of food systems (IPCC, 2018). The NMHSs play an important role in the provision of these services to farmers. PMD provides WCISs to farmers through different means (e.g. internet, TV, radio) to help them better plan their agricultural operations. However, there is still limited empirical evidence of the scope and scale of potential benefits of using WCISs in Pakistan (Suckall and Bruno Soares, 2022) which this study aimed to address.

Research overview

Under the UK Aid- funded Asia Regional Resilience to a Changing Climate (ARRCC) programme, the University of Leeds (UoL) and ICIMOD together with the PMD and the Muhammad Nawaz Shareef University of Agriculture, Multan (MNSUAM) pursued a study whose aim was to identify areas where the WCISs produced and disseminated by PMD could be improved to better fit farmers' needs. This study was underpinned by the concept of equity and focused on understanding the current users of WCISs provided by PMD, examine farmers' perceptions of usefulness and usability of such services as well as barriers to its use, and determine the socio-economic benefits and costs of the services provided. The study covered 24 randomly selected villages in drought - and flood - prone areas of Pakistan's Punjab and Sindh provinces where wheat (as a staple food crop) and cotton (as a cash crop) are grown. Data collection comprised of two structured questionnaire surveys pursued in April and October 2021 among 612 households as well as 19 focus group discussions (FGDs) (to capture greater details from those farmers and complement survey data).

Key findings

The study found that more than half of the farmers surveyed (56%) currently use WCISs many of which are based in Punjab (71%) rather than in Sindh (23%). Around 58% of men and 53% of women use WCIS, and nearly 50% of the WCIS users depend on two PMD information sources (weather news on national TV and PMD's SMS services).

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Both the survey and FGDs analysis have showed that most participants (56%) use WCISs (particularly daily weather forecasts and farming advisories) to make decisions in key farming activities such as planting times, harvesting times, threshing times, irrigation, choice of planting varieties, use of pesticides and chemicals, and drying. Supporting timely farming decisions, helping produce better crops, and timely/effective irrigation and harvesting were regarded by farmers as the key benefits of using WCISs.

Our study also examined the impact of using WCISs on profit, revenue, and cost for cultivating cotton and wheat crops. Although no overall differences were identified between users and non-users of WCISs in terms of profit, revenue and cost, those using WCISs spent less (21.3%) on agro-chemicals when producing wheat crop than farmers not using WCISs.

Key barriers to using WCISs – for both users and non-users of WCISs that help explain the small difference between the benefits of using WCISs between users and non-users – included:

- Accuracy, relevance and usefulness of information including lack of trust in the information, information not relevant to their needs and information hard to use/understand;
- Accessibility to the information such as difficult/limited access to internet/mobile network and language barriers;
- Timeliness of the information as information often arrives too late to allow farmers to act.

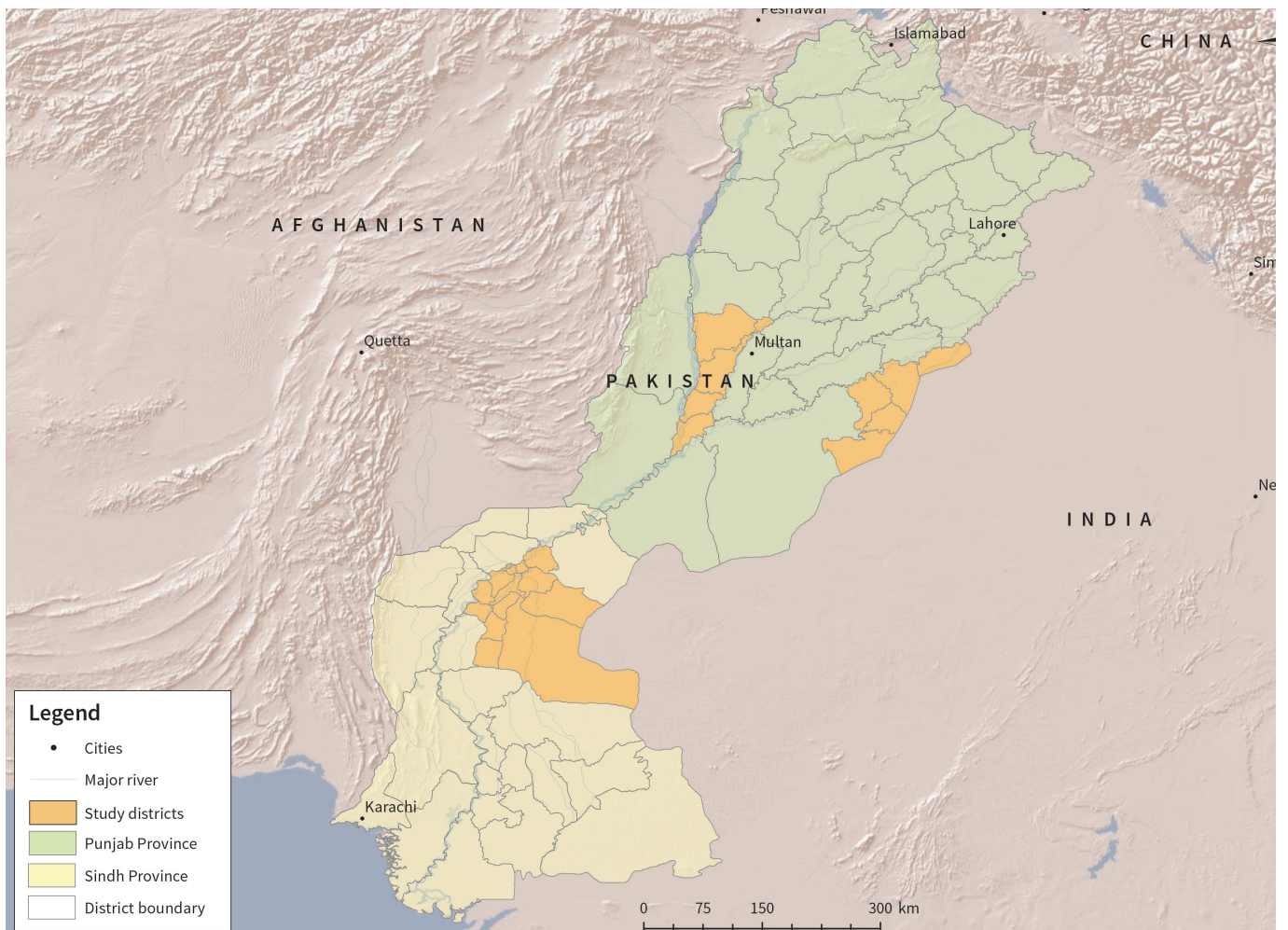
Recommendations

Some key recommendations from this study included:

- Gender considerations should be at the forefront when enhancing WCIS (e.g. ensuring the right means of access, timing of information, local languages, support by female extension officers) as well as when designing and implementing training and awareness raising activities (e.g. through female-only training events);

- Enhance weather and climate information currently provided, including making information available in other local languages (e.g. Sindhi, Punjabi, Saraiki) to increase accessibility and understandability; Broadcast other types weather and climate information with longer lead time to allow other types of actions by farmers; Broadcast weather news on national TV at alternative times when farmers are available (e.g. around 12pm);
- Provide information with higher spatial resolution; provide information on volume of rain expected as well as on winds and storms to help with key decisions such as spreading fertilisers/pesticides;
- Raising awareness and implementing training activities including raising awareness activities regarding WCISs (particularly for farmers not currently using this information); training events at village level;
- Explore opportunities to enhance and expand existing extension services (including linking with non-PMD extension services) and the role of other current key informants/champions operating at local level;
- Further understanding the type of WCISs information that could be most useful to farmers through effective co-production processes (that could be aligned with ongoing training activities);
- Set up feedback mechanisms (which can be linked to support systems for farmers e.g. extension services but also building capacity activities, SMS service, etc) to enable ongoing learning and enhancement of weather and climate information provided to farmers.

Location of study area



Final remarks

This brief provides a synopsis of the analysis pursued and key finding regarding the current use of PMD weather and climate information services (such as agro-met advisories) as well as key recommendations to help increase the use of such information services amongst farming communities. Many of these recommendations broadly align with existing agriculture, food security and climate related policies in Pakistan. For example, Sindh and Punjab Agriculture Policies recognise the need for capacity building and training farmers in techniques that allow them to pursue smart agriculture in light of climate variability and change as well as the need to provide timely weather forecasts through a range of mechanisms (SAP, 2018; PAP, 2018, GoP, 2018). Punjab's Agriculture Policy (2018) as well as the Pakistan Climate Change Policy (2021) also recognise and emphasise the importance of strengthening and empowering the role of women in agriculture towards greater

inclusiveness, reducing vulnerability to climate change impacts and ensuring food security. However, this study provides more specific and nuanced recommendations that can be taken into consideration when developing future policies.

The PMD should also consider these findings to improve existing information products and support the development of future policies and services particularly regarding gender considerations, building capacity and training, and increasing accessibility to weather and climate information to enable farming communities in Pakistan to effectively address and adapt to climate variability and change.

The full report of this study can be accessed at:

<https://bit.ly/ARRCC-report-pakistan>

References

Government of Pakistan, 2022. Pakistan

Economic Survey 2021-2022. Available online at: http://www.finance.gov.pk/survey/chapter_22/PESo2-AGRICULTURE.pdf

Government of Pakistan, 2021. National Climate Change Policy. Ministry of Climate Change.

Islamabad, Pakistan. Accessible at: <https://www.mocc.gov.pk/SiteImage/Policy/NCCP%20Report.pdf>

IPCC, 2018. Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds)].

Punjab Agriculture Policy (PAP), 2018.

Government of Punjab. Available at: <https://agripunjab.gov.pk/system/files/Punjab%20Agriculture%20Policy.pdf>

Sindh Agriculture Policy (SAP), 2018.

Government of Sindh. Available at: <http://extwprlegs1.fao.org/docs/pdf/pak191432.pdf>

Suckall, N. and Bruno Soares, M. (2022).

Evaluating the benefits of weather and climate information services in South Asia: A systematic review. Regional Environmental Change. <https://doi.org/10.1007/s10113-022-01947-7>

WMO, 2015. Valuing Weather and Climate: Economic Assessment of Meteorological and Hydrological Services In:

https://library.wmo.int/doc_num.php?explnum_id=3314, O. A. (ed).

Government of Pakistan (GoP), 2018. National

Food Security Policy. Available at: <https://www.fao.org/faolex/results/details/en/c/LEX-FAOC184963/>