

agMOOCs

Response farming - a type of farm planning is being practice in Australia considering seasonal climate forecast

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Dear students. In the last classes we have seen two types of agro advisories preparation. Only with the receipt of the weather forecast for five days from the organization and Agro Met Field Units considering the crop stages, crop-weather interaction, the people, responsible people prepared agro advisories and communicate to the farmers through SMS. The second case a prototype was discussed wherein as a case study from Tamil Nadu the weather windows have been identified earlier through permutation and combination process and by that for Tamil Nadu they have identified 54 weather windows which covers the entire season, all season of year. And simultaneously agro advisories for these 54 weather windows for 109 crops have been prepared and also put it in the server.

The server, own server is exclusively meant for developing weather forecast for five days by using the regional climate model, by getting data automatically from the automated weather station fitted established in the concerned plot. So this computer after selection the server router, developing the weather forecast goes to the weather window, concerned weather window is selected and any crop is needed, the crop, concerned crop is being considered and agro advisories automatically communicated to the farmers through SMS, everything automated. At one end our scientists and the other end the farmer, in between all interfaced with all machines and servers and everything.

Now we reach a third type. It is being done at farm level especially at Australia. This response farming, see a type of farming system, I can say farm planning is being practiced at Australia till now. It has been developed a (inaudible 00:02:17) there. It's a good concept. Since the individual landholding is more than 5,000 hectares in Australia this system is going on very well with that country. But this was also dusted about 20 years back in India but somehow it was not taken by our farmers due to many reasons, but it is a wonderful technology. It can be practiced at the farm level if the farmer is very much knowing the information about response farming. Let us discuss today this type of farming. This is very very good.

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What is Response Farming

- Framing flexible adaptation strategies for the forth coming rainy season
- It is methodology that identifies and quantifies seasonal rainfall related risks(Stewart,191) and guides to develop strategies for addressing them at farm level
- This approach couples seasonal rainfall forecast with appropriate agronomic responses/tactics concerning crop planning

Here, you are combining the seasonal climate forecast with individual farm decisions. No intervention from any agro advisory institution or anything else. The farmer himself prepares the agro advisory based on the weather information he obtains from the concerned meteorological organization of that country. In respect of India this is India Meteorological Department. If you go to Australia the Bureau of Meteorology like that different countries have their own meteorological organization they provide seasonal climate forecast.

Here only they consider the seasonal climate forecast of a season or in terms of India it is long-term or long range weather forecasts being considered. So here the people -- many people try to give definition. Now I'd like to go to an example, you know drought, drought means no rainfall, dryness everything. For this situation more than 100 definitions are available around the world. Similarly for these response farming also we could be able to spell out too many definitions, but I have screened and I'd like to provide about two or three so that you can understand what is response farming.

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What is Response Farming

- Framing flexible adaptation strategies for the forthcoming rainy season
- It is methodology that identifies and quantifies seasonal rainfall related risks(Stewart,191) and guides to develop strategies for addressing them at farm level
- This approach couples seasonal rainfall forecast with appropriate agronomic responses/tactics concerning crop planning

One is framing flexible adaptation strategies, adaptation, very very important for the forthcoming rainy season. So you are preparing yourself. You are meeting the challenge from the forthcoming seasons. That is a definition. The second one is it is a methodology that identifies very very important, critical world. And quantifies seasonal rainfall related risk. So in advance you are able to identify the forthcoming seasonal rainfall risk and you can develop the strategies for addressing them at farm level. This is very, very important. Farm level means individual farmers level. Then the third definition says that couples seasonal rainfall forecast with appropriate agronomic responses. How the terminology gets deferred. So when they define the response farming means you can be able to understand what is response farming by different sources.

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•It is a flexible system of farming in which key farm decisions affecting crop water utilization is taken in response to pre season and early season rainfall predictions.

It focuses on water and its management at farm level for sustaining crop production by reducing climate related risks.

And another definition is given by somebody. It is a flexible system of farming in which key farm decisions key important, priority decisions affecting crop water utilization. See, we were discussing about crop water requirement when we were discussing about rainfall. I was telling that rice requires about 1040 mm, pulses is 200. So based on the forthcoming rainfall season he estimates what would be the available water accordingly you can to select your crop for that season. This is the definition for this. One more definition is he'd focus on water and its management farm level similar to A and K. Then these are the some definitions given but overall response, you are responding to my questions similar that response farm is not met in response to these forthcoming seasonal rainfall what do you do at your farm we call it as response farming.

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Hypothesis for Response Farming

Solutions to farming problems may be found for improved forecast of expected seasonal rainfall behavior in the cropping season

Now that must be hypothesis. This was a tested experimentally at Australia. They put the hypothesis to that. Solutions to farming problems may be found. It is possible. That is solution to farming problems may be found for improved forecasts of expected seasonal rainfall behaviour in the cropping season, very nice. You can able to select or you can be able to provide solution for the risk to be received from the forthcoming rainfall season. This is a wonderful hypothesis, but it is possible or not it was tested and this hypothesis was agreed that solutions are already available. So you can pick up the solutions based on your knowledge, based on the scientific knowledge to meet the challenge from the forthcoming rainfall season.

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Aim of Response Farming

- To exploit high rainfall seasons potential and minimize the risk of crop failures in poor rainfall season using rules based on date of onset and early season cumulative rainfall

Then there must be aim also, how wonderfully they have put it, exploiting the high rainfall potential, if rain comes more how to use it? Can you store it? Can you conserve it without losing to any sea or ocean? So exploiting the high seasonal rainfalls you change your land use pattern. You change your cropping pattern from pulses to rice to exploit the high rainfall and minimizing the risk of crop failures during the poor rainfall season. So you are meeting both situations. I was telling about weather code, drought code and flood code. So response farming covers both course also. So this is how this response farming is like that, very very important to be considered.

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Which forecast is suitable for Response Farming

- Long range weather forecast and Seasonal climate forecast, since they have enough lead time to take farm decision on land use pattern, crop planning, technology selection and tailoring

Then would you forecast is suitable? We have studied downcast and short-range forecast then medium-range forecast of different in nature that is a regional climate model, numerical weather prediction and also long-range forecast, seasonal climate forecast. So we have learned a little bit on these forecast types. What are the forecast would be highly suitable for these response farming is your long-range weather forecast and seasonal forecast, because they have lead time 45 to 15 days earlier to the season you could be able to smell this is the quantity of rainfall you are going to get it. So by that time you can prepare yourself for meeting the challenge. So you can take land-use pattern, normally the farmer in Australia they cultivate wheat if your farmer has a 5,000 hectares he may cultivate 2,000 hectares wheat.

Suppose there is a drought then he will reduce the area to 2,000 or 500 hectare. Even they can call out animals, when the drought is anticipated they may have 50,000 blocks or 5,000 cattles they mercilessly they reduce their cattle number 100 are 50, so that forage can be fat in the case of the drought. So they prepare themselves for the forthcoming seasonal rainfall. You can select a technology. If drought comes, means you can select a drought management technology. Like that many things are available in scientific knowledge. So those can be rightly utilized for this first.

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Where Response Farming is Useful

- Arid and Semi arid climate regions
- Regions with frequent climate variability
- Where adaptations strategies developed already at village level

Then where response farming useful? Can we practice in humid climate? I was saying humid climate. In humidity climate rainfall and PET Potential Evapotranspiration are equal. Say, if it is 2000 mm your rainfall the operation also 2000 mm, there is no imbalance, equality. So it cannot be practiced in humid environment. It can be practiced in arid, where the rainfall is lesser than 50% of the potential evapotranspiration annual basis. Semi-arid, it is 52.8 I told already, you kindly refer to our earlier class notes.

Then regions with climate variability, this is very very important. Variability means changing the climate. Now I can explain between the climate change and the climate variability. Earlier we have pendulum clocks, so the pendulum oscillates like this. So pendulum is here, it goes to positive direction, it comes to negative direction then comes to middle. This is the climate variability. This maybe five years come to normal then negative side five years come to normal. So oscillating normal code, your drought code and flood code, this we call it as climate variability.

In the case of the climate change the pendulum weather goes to minus, stage there permanently, that means, it stays there, does not come the normality. That is the climate change. So this technology is highly useful in the case of the climate variability. I think you must have understand the difference between these two things. So response farming must be highly suitable for this situation and also certain villages by having the indigenous knowledge they have developed the strategies against a flood and drought. See we were discussing yesterday I hope climate managers, such wonderful people are still available in certain villages and they have tailored certain technologies, local technologists to meet the weather operation situations.

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Additional tool required in Addition to SCF/LRF

- Document on onset date
- Document on conditional probability of rainfall
- Document on initial probability of seasonal rainfall
- Document on rainfall return period
- Document on length of growing period
- Farm size information
- Land use pattern used in the past

Now additional tool what other tools you want in addition tools seasonal climate rainfall forecast, you must have a document on onset date. When the rainfall is going to sit in a particular village or particular domain? Then these are all some statistical conditional probability of rainfall. Conditional probability of rainfall means in some rainfall you fix a certain quantity of rainfall whether it comes or not. That is a conditional probability. If the probability your fixed rainfall is 30% means you may not expect that amount of rainfall. The conditional probability is more than 90% then you get definitely that rainfall you can decide your farm decision making process. Then probability of an initial probability of seasonal rainfall then rainfall return period and length of growing period, farm size information, land use pattern, these are all optional. If you don't have don't worry, you get your seasonal climate forecast and do your farm decision making at your farm level that seems to be very excellent. (Refer Slide Time: 13:44)

Case Study in India(Coimbatore)

- Normal crop : rice during Oct-Nov with ground water support in addition to rainfall
- Normal seasonal rainfall: 420mm
- Seasonal climate forecast (SCF) predicted rainfall: 250 mm
- Farmers response to SCF:
80 per cent farmers went for rice and 20 per cent farmers went for black gram with season

Now I like to produce a case study from Coimbatore, whether the response farming was very good or bad. So the normal crop of a particular village, I am talking about a village not individual. The normal crop of the particular village is rice during October/November. They get in addition to rainfall water support from groundwater. The normal rainfall of the village is 420 during the season. So 220-millimeter rice needs about 1400 millimetre. So excess is being attained from the ground water. The seasonal climate forecast says for the village that the village is going to get only 250 mm rainfall against 420. So deficit, only 50% of the normal rainfall the farmers are going to get. So farmer's response to SCF; what the farmers have decided? 80% of the farmers did not believe our forecast. They went for rice and 20% listen to our forecast they went for black gram. So 80% farmers went for conventional rice cultivation, 20% having understood in the importance of weather forecast they had gone to black gram.

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Economics of the Case Study

Details	Farmer with black gram	Farmer with rice
Cost of cultivation (Rs./4000m ²)	5000.00	12000.00
Revenue(Rs./4000m ²)	7500.00	Nil (crop failure)
Gain(Rs./4000m ²)	$7500+12000=19500-5000=14500$	Nil

What happened? The rainfall was around 250 millimetre as forecasted and rice whoever raised they met with failures and the fellow who raised black gram came into success. So here cost of cultivation farmer with black gram. This is per acre or 4000 meters, it is around 5000 rupees. The fellow rice farmer along with the nursery development everything he went up to 12,000 rupees. Revenue, this fellow has got 7,500, while this because of the crop failure he did not anything. So gains to the farmer of the black gram is this 7400 and this cost of cultivation, so 19,500 minus your cost of cultivation, so net gain is 14,500 by listening to the forecast. Is it not wonderful of doing a response forming in the case of considering the seasonal rainfall?

So this is best opportunity to utilize this mode. So you use the agro advisories whether it is coming from institution or through automated mode or through the response farming, you do weather wise farming system and reduce the risk and get your crop success. That's all. Thank you very much.