

A Case Study on Assessment of Michaung Cyclone Effect in Khammam District of Telangana

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Introduction:

A "Cyclonic Storm" or a "Cyclone" is an intense vortex or a whirl in the atmosphere with very strong winds circulating around it in anti-clockwise direction in the Northern Hemisphere and in clockwise direction in the Southern Hemisphere. The word "Cyclone" is derived from the Greek word 'Cyclos' meaning the coil of a snake. To Henri Piddington, the tropical storms in the Bay of Bengal and in the Arabian Sea appeared like the coiled serpents of the Sea and he named these storms as "Cyclones". Tropical cyclones are also referred to as 'Hurricanes' over Atlantic Ocean, 'Typhoons' over Pacific Ocean, 'Willy-Willies' over Australian Seas and simply as 'Cyclones' over north Indian Ocean (NIO).

Michaung cyclone:

A low-pressure area laid over South Andaman Sea on 27th November, 2023. It moved west - north westwards and further, intensified into a depression over southeast Bay of Bengal in the early morning (05:30 hours IST) of 1st December, into a deep depression in the early morning (05:30 hours IST) of 2nd December, into the cyclonic storm "Michaung" in the early morning (05:30 hours IST) of 3rd December and into a severe cyclonic storm in the noon (11:30 hours IST) of 4th December. It crossed Andhra Pradesh coast between Nellore and Machilipatnam, close to south of Bapatla during 12.30-14.30 hours IST, as a severe cyclonic storm with wind speed of 90-100 kmph gusting 110 kmph. Thereafter, the cyclone crossed Khammam district of Telangana and weekend into deep depression (18:00 hours) of 5th December, into depression (00:00 hours) of 6th December, into a well-marked low-Pressure area (WML) over Northeast Telangana (03.00 hours) of 6th December (IMD, 2023).

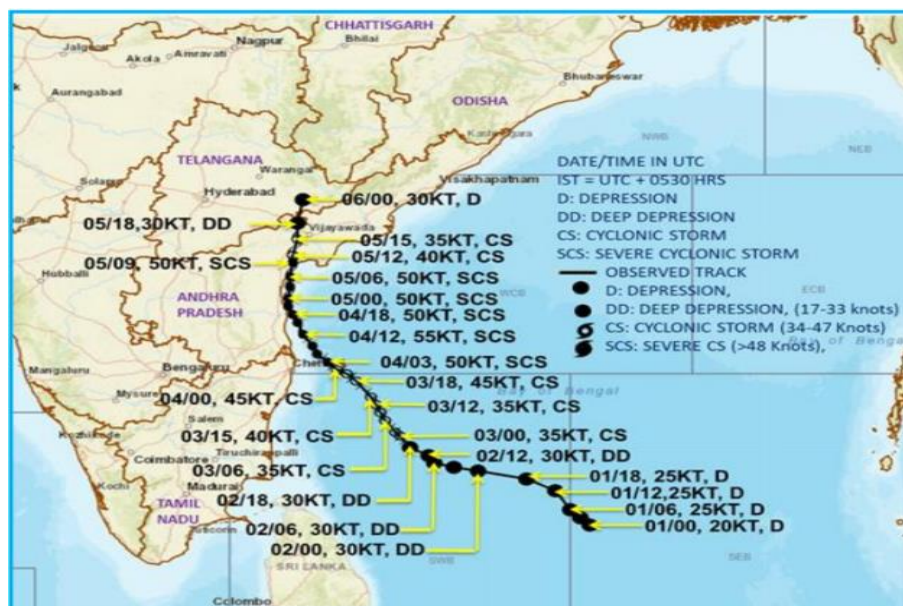


Fig. 1: Observed track of severe cyclonic storm “Michaung” over the Bay of Bengal during 1st -6th December

Crop conditions of Khammam district, Telangana state during the period of the cyclone:

S. No.	Name of the crop	Stage	Prone to damage
1.	Rice	Grain hardening to harvesting and harvesting to post harvesting stage	<ul style="list-style-type: none"> Lodging of crop Washing out the harvested paddy produce
2.	Cotton	2 nd to 3 rd picking stage	<ul style="list-style-type: none"> Drooping of cotton lint Damage of cotton quality
3.	Maize	Sowing to vegetative	<ul style="list-style-type: none"> Lodging of crop
4.	Chilli	Flowering to fruit development	<ul style="list-style-type: none"> Lodging of chilli plants
5.	Pulses (Green gram, Black gram)	Vegetative to flowering	<ul style="list-style-type: none"> Lodging of the crop
6.	Banana	Vegetative development to fruit stage	<ul style="list-style-type: none"> Banana plants are susceptible to damage from strong winds

Alerts / Warnings were given by District Agro-Met Unit (DAMU), KVK, Wyra during Michaung Cyclone

- Five alert/ warning messages regarding forecast of Michaung cyclone were given to the 16,230 farmers through WhatsApp group of DAMU from 1st December to 6th December, 2023.
- Four impact-based forecast (IBF) advisories were disseminated through WhatsApp groups for 16,230 farmers in the view of strong gusty winds associated with heavy to extremely heavy rainfall for Khammam district from 2nd December to 5th December, 2023 to harvest the paddy crop which is ready to harvest and protect the harvested paddy produce by covering with Tarpaulin cover carefully, as it was a major crop and more prone to damage.
- In the IBF advisories, farmers were suggested to download the DAMINI mobile app from the Google store to get alerts 7, 14 and 21 minutes well before the occurrence of lightning and thunder storm.
- In the view of cyclone 4 warning messages were published in the social media, Local app news and 26,400 views were observed.
- Department of Agriculture, Khammam district officers (DAO, MAOs, AEOs) were also forwarded DAMU messages to the farmers (~36,540) from their WhatsApp group.
- DAMU disseminated weather forecast messages to 16,500 farmers through Kisan Sarathi portal.
- Ameliorating measures of post cyclone were given to the farmers and published in the print media (Sakshi).

Observed rainfall datum during Michaung cyclone in Khammam district of Telangana:

Date	Khammam dist. average rainfall received (mm)	Maximum rainfall received station in Khammam dist.(mm)
Day 1 (04.12.2023)	10.2	21.4 (Yerrupalem)
Day 2 (05.12.2023)	99.1	164.2 (Sathupally)
Day 3 (06.12.2023)	0.3	1.6 (Kalluru)
Total Rainfall	109.6 mm	-

(TSDPS, 2023)

Observed weather at automatic weather station (AWS), KVK, Wyra during Michaung Cyclone:

Date	Rainfall (mm)	Wind speed (kmph)	Tmax	Tmin
Day before (03.12.2023)	0.0	9.26	32.3	24.3
Day 1 (04.12.2023)	9.0	18.52	28.2	22.8
Day 2 (05.12.2023)	121.0	31.48	23.7	21.3
Day 3 (06.12.2023)	0.5	9.26	23.0	21.0

Incidence of lightning and thunderstorm in the Khammam district of Telangana due to the cyclone:

- There was no incidence noticed due to the lightning and thunderstorm during the period of cyclone in the district.

Effect of Michaung cyclone in different crops of Khammam district of Telangana:

As per the preliminary assessments from the department of agriculture, 59,307 acres of Rice, 348 acres of Cotton, 5,262 acres of Maize, 17,267 acres of Chilli and 7 acres of Black gram (Total 82,191 acres) were affected due to submergence/water logging/lodging because of heavy rainfall associated with gusty winds (30–40 kmph) in the event of Michaung cyclone in Khammam district.

Impact of DAMU to manage different agricultural activities in various crops in the view of severe cyclone:

Paddy was one of the major crops cultivated about an area of 2,73,734 acres during the Kharif season, 2023 in Khammam district of Telangana. Out of the total cultivated area, nearly 23.56 (64,400 acres) per cent of total area was already harvested before the date of 31st November, 2023. The farmers who were already harvested the rice produce were well protected by transporting at safer place and covered carefully with the help of Tarpaulin cover in well advance. Nearly 10.79 (29,560 acres) per cent of paddy which is ready to harvesting stage was harvested from 1st December to 4th December due to alerts and warning messages given by DAMU, KVK, Wyra.

In addition to it, by following DAMU alert messages, farmers have postponed the harvesting operation of paddy whereas, chilli and maize cultivating farmers have postponed

their irrigation and spraying operations, and fertilizer application. Cotton which is at ready to picking was also done well before in the view of cyclone forecast by many farmers of the district.




Crop lodging due to heavy rainfall associated with gusty winds



Covered harvested produce with tarpaulin cover during the cyclone

Feedback collection during the post cyclone period:

Efforts were made to collect feedback from 30 farmers on usefulness of cyclone forecast alert messages and their opinions were recorded about making adjustment in their farm operations which are prone to interrupted by cyclone. Seven feedback videos from the farmers, one from pesticide dealer, one from Mandal Agriculture Officer (MAO) and one from Agriculture Extension Officer (AEO), totally ten videos were taken. Given below three case studies were recorded from the benefitted farmers by following Alert/ Warning messages of DAMU, KVK, Wyra during the period of Michaung cyclone.

Case study - 1	Name of the DAMU Name: KVK, Wyra	Farmer Photo
Farmer Details	Rayala Apparao, Konijerla Village, Konijerla Mandal	
Weather Event	Michaung Cyclone, 4-6 th December, 2023	
Crop Benefited	Postponement of irrigation operation for Maize crop	
Agromet Advisory along with Economic Benefit	Rayala Apparao was a farmer cultivating maize and chilli crops from 7 years. During the year, 2023 he had cultivated 5 acres of maize and 2 acres of chilli. He regularly watches the rainfall alerts through WhatsApp group of DAMU, KVK, Wyra, Khammam district. On 2 nd December, 2023 he received warning messages of heavy rainfall from 4 th to 6 th December, 2023 in the	

	district due to Michaung cyclone. Thereafter he postponed the irrigation operation for both the crops. For this action he saved nearly Rs. 3500/- while comparing to other non-following forecast messages.	
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Success story - 2	Name of the DAMU Name: KVK, Wyra	Farmer Photo
Farmer Details	Yelamathi Kutumbharao, Billupadu Village, Thallada Mandal	
Weather Event	Michaung Cyclone, 4-6 th December, 2023	
Crop Benefited	Early harvesting of paddy crop	
Agromet Advisory along with Economic Benefit	Y. Kutumbharao was paddy cultivating farmer from 9 years. In the kharif season, 2023 he had cultivated 13 acres of paddy. He regularly watches the rainfall alerts through WhatsApp group of DAMU, KVK, Wyra, Khammam district. 1 st and 2 nd December, 2023 he received strong gusty winds associated with heavy rainfall for three days when his paddy crop is ready to harvest. Then he immediately contacted to the harvest machine operators and harvested crop. Thereafter he covered with tarpaulin cover with carefully. For this action he saved nearly 13 acres worth of paddy produce.	
Success story - 3	Name of the DAMU Name: KVK, Wyra	
Farmer Details	Thalluri Ramesh, Pinapaka Village, Thallada Mandal	
Weather Event	Michaung Cyclone, 4-6 th December, 2023	
Crop Benefited	Early harvesting of paddy crop	
Agromet Advisory along with Economic Benefit	T. Ramesh was paddy cultivating farmer from 6 years. In the kharif season, 2023 he had cultivated 4 acres of paddy. He regularly watches the rainfall alerts through WhatsApp group of DAMU, KVK, Wyra, Khammam district. On 1 st December, 2023 he received cyclone	

	<p>alert message. Then planned to harvest the crop before the approaching of cyclone. As per planning he harvested the 4 acres of paddy crop which is at ready to harvest. By this early harvest operation, he saved 4 acres of produce from the cyclone and covered the produce with tarpaulin cover after transporting at safer place.</p>	
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References:

Cyclone Warning Division, India Meteorological Department, New Delhi December, 2023.
Severe Cyclonic Storm “MICHAUNG” over the Bay of Bengal (1st -6th December, 2023):
A Report.

