Estimating the economic benefits of Investment in Monsoon Mission and High Performance Computing facilities

A Study Commissioned by

Ministry of Earth Sciences

to

National Council of Applied Economic Research

Context of the study

National Monsoon Mission (NMM) initiated in 2012 with the broad objective

- to set up a dynamical prediction system for seasonal forecast,and
- to improve the monsoon forecasting skills in the country in all scales

Budget allocation for the NMM - **Rs 551crores**

(Rs 400 cr- 2012-17 , Rs 151 cr – 2017 -18)

Achievements

- Dynamical seasonal prediction model for monsoons at a very high resolution of 38 kms
- extended range prediction (for next 20 days) useful for dry/wet spells, heat/cold wave etc. and
- a very high resolution ensemble prediction system at 12 kms in the short and medium range (up to 8 to 10 days), useful for extreme weather prediction.

Context of the study

High Performance Computing (HPC) facility at MoES institutes was augmented from 1 PetaFlop to 10 PetaFlop with a total investment of **Rs. 438.9 crore**

This brought in a paradigm shift in weather and climate modelling activity for operational weather forecasts

Hence, a total of Rs. 990 crore (~ Rs 1000 crores) has been invested in setting up NMM and HPC.

Both the programs were approved by the Cabinet Committee on Economic Affairs (CCEA)

It is, therefore, imperative that the economic impact of this investment is estimated through evidence-based research

Objectives of the study

- To estimate the economic benefits of the investments made in NMM and HPC
- To examine the role of improved accuracy of weather prediction in improving the livelihood of farming, livestock rearing and fishing communities
- To understand the importance of weather-based advisories in decision making and reducing loss in agricultural households and fishery households
- To examine the economic benefits with gender perspective

Survey

- NCAER Conducted a primary face-to-face survey in collaboration with the Reliance Foundation Information Services (RFIS)
    - 173 districts spread across 16 states of India
    - Questionnaire designed to collect information for reference period from April 2015 to March 2019. It also collected data on access to weather services – “currently” and “before 2015”
    - A face-to-face survey of 6098 respondents (including 3,965 farmers, 757 marine fishermen and 1,376 livestock owners) was conducted to gauge the economic impact;
    - Interactive Voice Response Survey (IVRS) of around 2 lakh respondents was conducted to validate the findings of face-to-face survey.

Key findings – survey of agricultural households (farmers and livestock owners)

- 10.7 million below poverty line (BPL) agricultural households in rainfed areas
- 3,965 crop farmers interviewed across 121 districts of 11 states of India
- 1,376 livestock owners interviewed across 92 districts of 10 states of India

i. Reliability: 94% of farmers and 53.7% of livestock owners are seeking weekly advisory instead of seasonal advisory post NMM

ii. Gain in income/ avoid loss : 80 % of the farmers and 83% of livestock owners who received information on natural calamities reported to have reduced losses occurring due to them

Key findings – survey of agricultural households (farmers and livestock owners)

iii. Adoption of weather advisory in critical practices

- 98% farmers* and 76% of live stock owners# made modifications to at least one of the critical practices based on the weather advisories & had income gain
- Average annual income of farming households which adopted no modification worked out to be Rs. 1.98 Lakh; Rs. 3.02 Lakh for those who adopted all the nine changes.
- Majority of livestock owners (96%) reported that weather advisories are improving the practice of vaccination against seasonal disease.
- 80 % of the farmers and 83% of livestock owners who received information on natural calamities reported to have reduced losses occurring due to them.

**changed variety/breed; arranged for storage of harvest; early/delayed harvesting; changed crop; early/delayed sowing; changed schedule of ploughing/land preparation; changed pesticide application schedule; changed fertilizer application schedule; and changed scheduled irrigation*

 # modification of shed/shelter; vaccination against seasonal disease; and fodder management

Key findings - Fishermen

- 0.53 million below poverty line (BPL) fisherfolk households
- 757 marine fishermen across 34 districts in 7 states of India
- 82% of fishermen reported using OSF advisories every time before venturing into sea and 87.7% of fishermen are using these advisories on daily basis, as compared to just 15.1% before 2015
- 95% of them reported to have avoided empty trips by following OSF advisories, which helped them save Rs. 18.25 crores of operational cost
- Rs. 1.92 crore additional income was generated from the 1,079 successful fishing expeditions made using the Potential Fishing Zone Advisories
- About 97% of the fishermen received information about flood or cyclone on time and about 86% were able to minimize their losses due to this.

Estimation of Economic Benefits

Key results

- The total annual economic benefits to the agricultural households (farmers and livestock owners taken together) works out to be Rs. 13,331 crores and incremental benefit over the next five years is estimated to be about Rs. 48,056 crores for the farming community.
- Annual income gained by fisher households is estimated to be Rs. 663 crore and the present value of benefits accruing to fisher-folk works out to be Rs. 2391 crore over a period of 5 years
- Hence, a total of Rs. 50,447 crore is the present value of economic benefit accruing to agricultural households and fisherfolk, realised over the 5-year period. About 26.6 % of the total benefits is attributed to women contribution
- With an initial investment of ~Rs. 1000 crores, NMM and HPC facilities result in a 50-fold increase in its economic benefits

Thank you