Q5

How was India benefitted from the contributions of Sir M. Visvesvaraya and Dr. M. S. Swaminathan in the fields of water engineering and agricultural science respectively?

UPSC Civil Services Mains 2019 · GS III · 10 marks · Indian Economy

Indian Economy and issues relating to planning, mobilization of resources, growth, development and employment.

Core demand of the question

- Show how Sir M. Visvesvaraya helped India in water engineering
- Show how Dr M. S. Swaminathan helped in agricultural science
- Keep benefits concrete and a 10-mark length

Revision summary

- **Visvesvaraya:** KRS dam, automatic weirs, Hyderabad flood works, and water for industry.

He framed public works and planned industrialisation around stored water.

- **Swaminathan:** dwarf wheat, IARI/ICAR, and escape from PL-480 dependence.

The National Commission on Farmers linked MSP, insurance and irrigation to livelihood.

- **Evergreen revolution is his caution:** yield with soil and groundwater, not only more canals.

Introduction

Sir M. Visvesvaraya and **Dr M. S. Swaminathan sit at two ends of India's food-and-water story: storing and directing river water, then breeding and advising so that water and seed become grain. One built dams, weirs and industrial water use** in the princely and early national period. The other led the **wheat revolution** and later argued for a farmer-centred **evergreen** path.

Body

Visvesvaraya and water engineering

- As Chief Engineer in Mysore he designed the **Krishna Raja Sagara (KRS)** reservoir on the Cauvery: storage for irrigation, drinking water and later hydropower around a water-scarce plateau.
- He invented and deployed **automatic weir floodgates** (patented block system) so reservoirs could hold more without sacrificing flood safety - a direct engineering answer to monsoon peaks.
- After the **1908 Musi floods** he planned modern **drainage and reservoir protection for Hyderabad**, cutting the city's flood vulnerability.
- **He linked water to** industry**:** Bhadravati iron works, planned towns, and a belief that **engineers and factories** must follow irrigation. That is an early **Make in India** instinct: water as productive capital, not only a canal for subsistence.

• As Dewan of Mysore and later a **Bharat Ratna (1955)**, he spread the idea of **planned public works**. India's later **Damodar, Bhakra and Nagarjuna Sagar** generation walked a road he had already mapped: store, irrigate, industrialise.

Swaminathan and agricultural science

• At **IARI** and in partnership with **Norman Borlaug's** dwarf wheat, Swaminathan adapted **high-yielding varieties** to Indian photoperiod and rust, which made the **Green Revolution** in Punjab, Haryana and western Uttar Pradesh possible in the late 1960s.

• India moved from ship-to-mouth wheat imports under **PL-480** toward **self-sufficiency**. That is a national-security as well as a farm gain.

• **He built institutions: ICAR** leadership, training, and the **M. S. Swaminathan Research Foundation** on coastal and tribal livelihoods, biodiversity and women farmers.

• The **National Commission on Farmers** **(2004-06)**, which he chaired, set the still-cited **MSP at C2 plus 50 per cent** recommendation and stressed irrigation, credit and crop insurance - the policy ancestors of **PM-KISAN**, **PMFBY** and irrigation missions.

• He warned early that the first Green Revolution had **groundwater, soil and nutrition costs**, and called for an **evergreen revolution**: more yield per unit of water, not only more water.

Flow diagram

Visvesvaraya -> KRS weirs Hyderabad drainage

KRS weirs Hyderabad drainage -> Irrigation and industry

Swaminathan -> HYV wheat Green Revolution

HYV wheat Green Revolution -> Food self-sufficiency

Swaminathan -> NCF evergreen agenda

Irrigation and industry -> Water plus seed

Food self-sufficiency -> Water plus seed

NCF evergreen agenda -> Water plus seed

Conclusion

Visvesvaraya gave India the engineering grammar of storage, floodgates and industrial water. Swaminathan gave it seed, institutions and a farmer-commission agenda so that stored water becomes food. Together they show that production is dams plus biology plus a fair price, not one hero crop.

Facts & figures

KRS

Krishna Raja Sagara on the Cauvery: Visvesvaraya's flagship storage for Mysore irrigation and city supply.

Automatic weirs

Block-system floodgates so a reservoir can store more and still pass a flood peak.

Green Revolution wheat

Swaminathan's adaptation of semi-dwarf lines at IARI, with Borlaug material, from the mid-1960s.

National Commission on Farmers

2004-06 reports; recommended MSP at C2+50 per cent and a livelihood frame still cited in farm policy.

Bharat Ratna 1955

Visvesvaraya honoured for engineering and public administration; Swaminathan received the same honour in 2024 for agricultural science.