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Q12

What are the areas of prohibitive labour that can be sustainably managed by robots? Discuss the initiatives that can propel the research in premier research institutes for substantive and gainful innovation.

UPSC Civil Services Mains 2015 · GS III · 12 marks · Indian Economy

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

Core demand of the question

- Identify areas of prohibitive or hazardous labour that robots can manage in a sustainable way
- Discuss initiatives that can drive real, gainful robotics research in premier Indian institutes

Revision summary

Prohibitive labour is hazardous, dirty, dull, or extreme work in mines, radiation, explosives, fire, underwater, space, furnaces, and isolation wards.

Robots can take that load if power, parts, safety, and worker reskilling are funded.

Premier institutes need mission testbeds, DRDO-ISRO-CSIR problem statements, and long chairs, not one-year gadgets.

Industry must buy qualified Indian machines so research has a market.

Score labs on field deployment with users such as NDRF and hospitals.

Flow diagram

Prohibitive labour -> Robots in field
 Robots in field -> Power spares safety reskill
 IIT IISc missions -> Substantive innovation
 DRDO ISRO industry -> Substantive innovation
 Substantive innovation -> Robots in field

Conclusion

- Pick five national use-cases - mine rescue, bomb disposal, sewer, hospital isolation, and farm spraying - and score institutes on field hours, not papers alone.
- Create a public **robotics proving ground** and a fast import window for research parts that now sit in customs.
- Tie fellowships to deployment with a user (NDRF, a mine, a hospital), then let the team spin out a firm.

- **Robots should take work that kills, poisons, or wears people out:** mines, radiation, bombs, fire, deep water, space, furnaces, and contagion. That is sustainable only with maintenance, safety law, and reskilling. Premier institutes will innovate if missions, testbeds, defence and industry buyers, and long fellowships replace short imported demos.

Facts & figures

Prohibitive labour

Work that is too dangerous, toxic, remote, or repetitive for sustainable human crews, including mines, radiation, and bomb disposal.

Tele-operation

A human stays at a safe console while a robot enters the hazard; this is often the first sustainable step before full autonomy.

DRDO and ISRO robotics

Defence and space agencies are natural buyers and problem-setters for institute research that must work in the field.

Cobots

Collaborative robots share a workspace with people for dull or heavy tasks; they still need guards, training, and labour policy.

Testbed

A shared mine, hospital, or disaster mock-up where IIT and IISc teams run hours of trials instead of only simulation.

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