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Shale Gas Extraction- Challenges in India

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The article 'The Shale Gas Challenge' appeared in The Hindu on 31st August, 2018. It brings out the various issues and challenges related to shale gas production in India.

The government has recently approved the policy that allows private and government bodies to explore and put to use unconventional hydrocarbons, including shale gas.

Unlike conventional hydrocarbons that can be extracted from the permeable rocks easily, shale gas is trapped under low permeable rocks. It requires a mixture of 'pressurised water, chemicals, and sand' (shale fluid) break low permeable rocks and have the access to the shale gas reserves. Around 5 to 9 million litres of water is used per attempt of extraction (fracturing) activity. These (fracturing) activities are likely to deplete water sources and cause pollution due to the disposal of flowback (produced) water. (Flowback water is the fluid that returns to the surface when shale fluid is injected underground at a high pressure to fracture the rock.)

Considering the challenges associated with the process, the government had issued a set of guidelines on environment management while extracting shale gas. The guideline states that these challenges will be taken care of while granting environmental clearances as per the Environment Impact Assessment process. However, one of the major loopholes of the programme is that the EIA process does not differentiate between conventional and unconventional hydrocarbons.

Conventional and Unconventional Resources

- **Conventional oil or gas** comes from formations that are straightforward to extract product from. Extracting fossil fuels from these geological formations can be done with standard methods that can be used to economically remove the fuel from the deposit. Conventional resources tend to be easier and less expensive to produce simply because they require no specialized technologies and can utilize common methods.

- **Unconventional oil or gas** resources are much more difficult to extract. Some of these resources are trapped in reservoirs with poor permeability and porosity, meaning that it is extremely difficult or impossible for oil or natural gas to flow through the pores and into a standard well. To be able to produce from these difficult reservoirs, specialized techniques and tools are used.

Even after the acknowledgment of the water requirement for fracking activities, the Government guideline does not provide a general estimate of water requirement per unit of shale gas extracted over a lifetime of a shale well. Various studies have observed that water use per well increases dramatically over a period of time.

Clear identification of the amount of water usage and places of shale gas extraction in India is necessary for considering the challenges that might be faced by the interlinked priority sectors like agriculture.

Water Contamination Due to Fracking

Shale rocks are usually found adjacent to rocks containing useable/ drinking water known as 'aquifers'. While fracking, the shale fluid could possibly penetrate aquifers leading to **methane poisoning of groundwater** used for drinking and irrigation purposes. Such contamination can be regulated to a certain extent by maintaining a distance between the aquifers and the shale gas fracture zones. The guideline, however, does not describe the properties of the barrier that can isolate and protect the groundwater. Specification on the government's end is required to avoid the confusion on the part of the extracting agencies.

The fracking process poses another challenge of recycling and leakage issues associated with the flowback water which is usually methane-contaminated.

The guideline fails to provide any substantive treatment or to recognise the increase in the flowback water as a result of the repeated extraction of shale gas from a well over a period of time.

Way Forward

Indian agriculture is largely dependent on groundwater. Implementation of the fracking processes without consultation, especially on 'water usage policy', may result in larger issues including **water stress, contamination of groundwater, and related health hazards** (like-dysentery, cholera, poisoning etc).

The issues of lack of land availability and skilled manpower should be addressed as well, along with all the other challenges associated with the extraction process.

Shale gas can be a solution for the rising energy requirements for a fast-growing economy like India. Utilisation of domestic shale gas can support India's growing energy demands besides reducing dependence on expensive energy imports. However, the government

needs to comprehensively regulate the fracking process for developing a sustainable shale gas exploration resources in India. A sector-specific EIA manual on exploration and production of unconventional hydrocarbon resources can be the starting point.