

# INTEGRATED CROP-LIVESTOCK- GOBAR GAS PRODUCTION LPM-610 (Unit-II)

**LECTURE-1**



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# Integrated Crop-Livestock-Gobar Gas Production

- The availability of land for agriculture in the present moment and the future will be in sub-optimal having low pH and poor nutrients.
- Conventional agriculture has been known to cause soil degradation due to intensive cropping, burning of crop residues and intensive application of chemical fertilizers, insecticides and pesticides.
- The increasing pressure on land and the growing demand for livestock products makes it more essential to ensure the effective use of land and feed resources including crop residues.

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- ▶ Integration of livestock in farming systems enables animals to help with farming operations and transport, and sale of animals sometimes provide cash for farming labours and agricultural inputs.
  - ▶ Integration of crop-livestock systems: To integrate all components of farming both horizontally and vertically, so that no waste is wasted.
  - ▶ Represents a key solution for increasing soil productivity, enhancing crop and livestock production, and safeguarding the environment through prudent and efficient resource use.

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- ▶ Integrated farming systems hold special position as the by-product of one system becomes the input for other.
  - ▶ Food crop residues such as straws or other biomass provide a suitable fodder for cattle and other ruminants.
  - ▶ While the food crop provides supplementary grain feed for productive animals.
  - ▶ Livestock waste in the form of manure and urine is the source of soil organic matter and fertilizer to improve soil productivity and crop yields.

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- ▶ All livestock waste can be processed to produce biogas as a source of alternative energy.
  - ▶ Biogas can be produced from simple organic raw materials such as cattle dung that could be used for electricity and as a fuel for domestic cooking.
  - ▶ Processing of 25 kg fresh cattle dung into the digester can produce 0.83 to 1 cubic meter of biogas.
  - ▶ Biogas is one of the most important bio-energy which can be used to replace natural gas.
  - ▶ Environment friendly and able to add a source of revenue and reduce the risk of failure.

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- The issues of cattle waste disposal, sanitation and environmental problems coupled with the high cost of fossil fuel make biogas production a better choice.
  - The rest of the manure out from the digester in the form of sludge and slurry is good ready-made organic fertilizer for soil amendment and crop production.
  - The sludge and slurry contain excellent nutrients such as N, P, K, Ca, Mg, Fe, S and other trace elements.
  - The rest of the manure out from the digester is a ready-made source of organic material that has anaerobically decomposed.

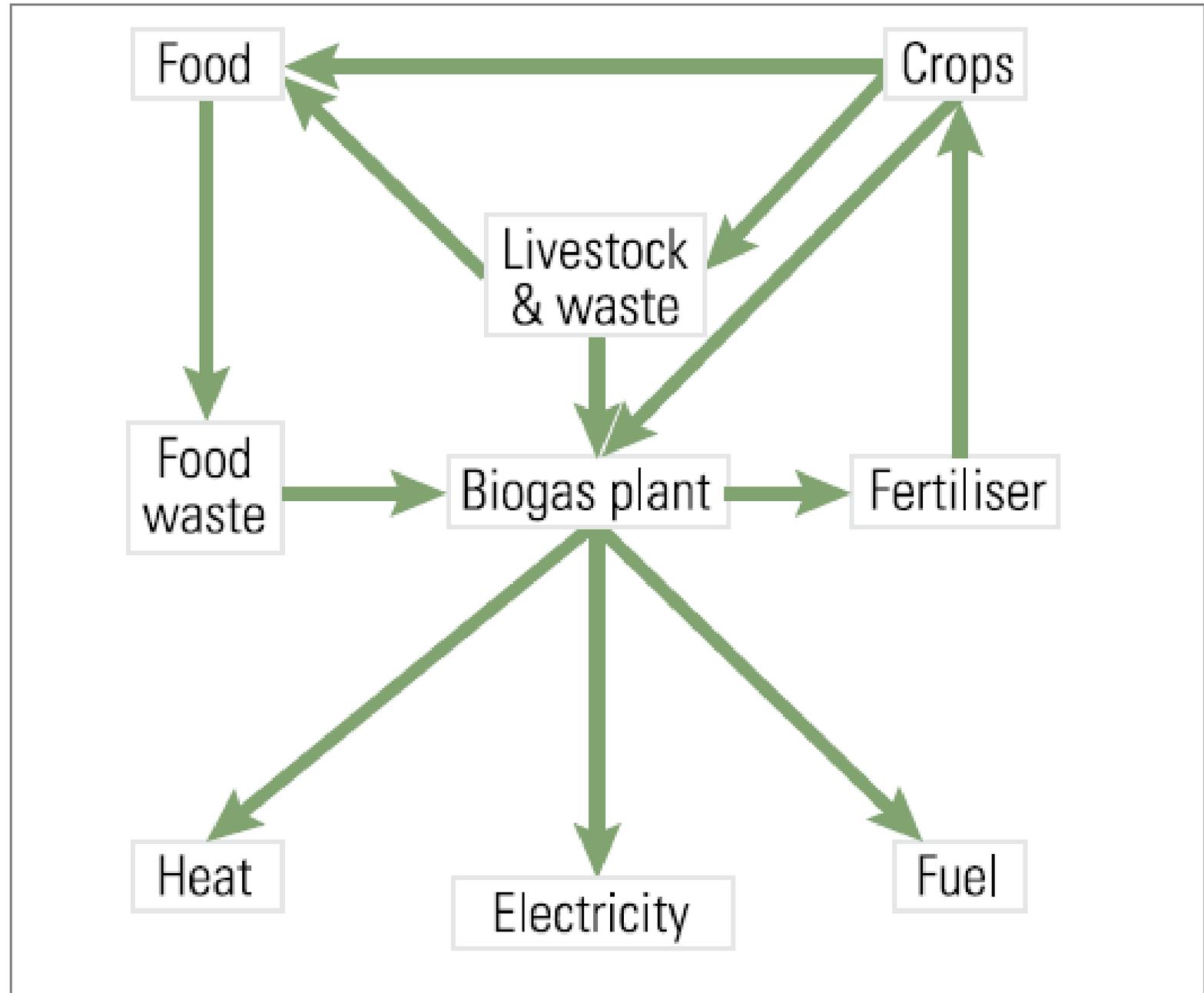
# Integrated Biogas or Gobar Gas Production

- The production of biogas across the world has gained considerable momentum over the last decades.
- However, substantial variation exists among countries in terms of sector development and number of plants.
- Some countries, like Germany and China, have shown rapid growth during the last decades, while in others countries it is just emerging.
- Globally, the generation capacity for biogas reached to 16.9 GW in 2017 from 6.7 GW in 2008.

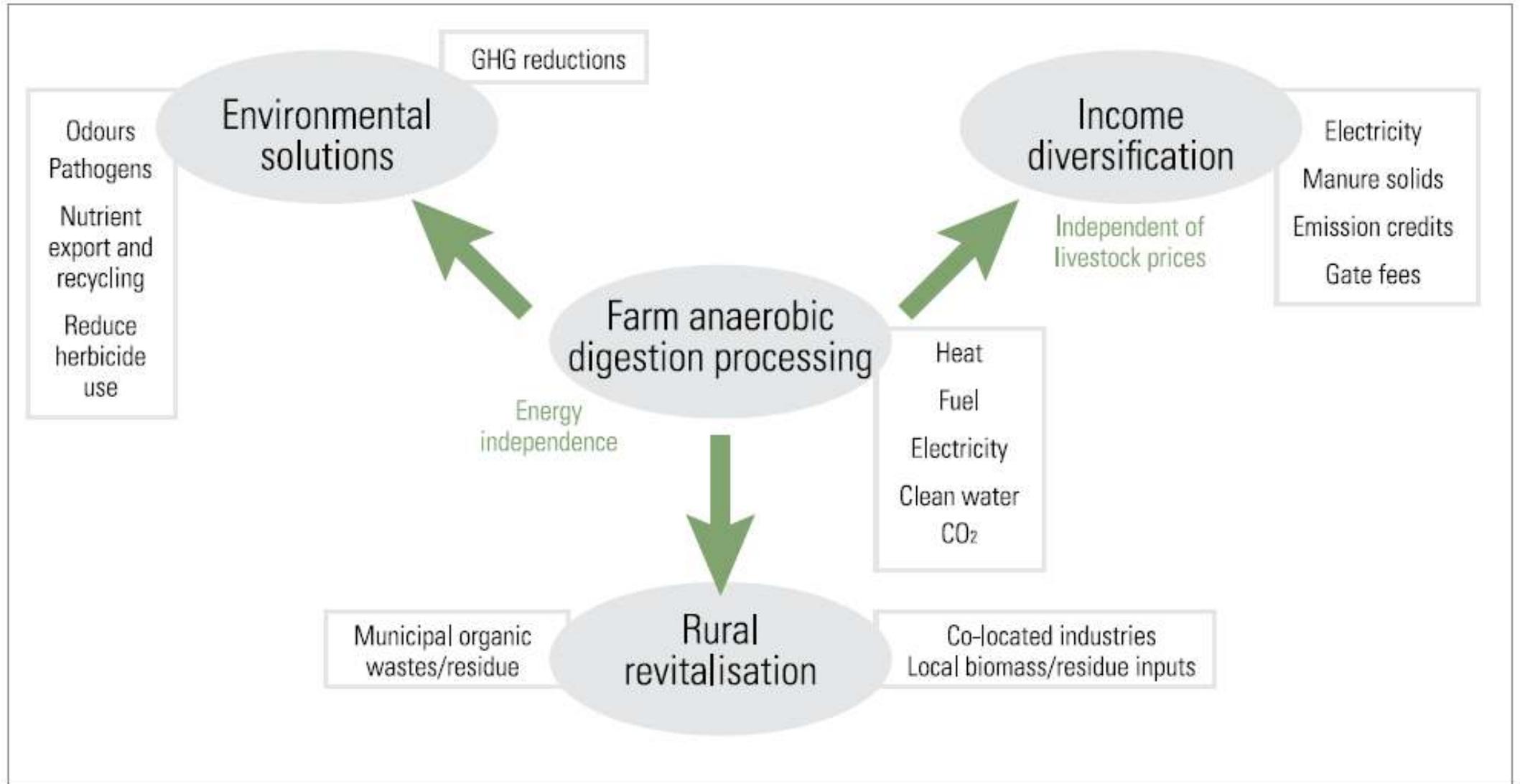
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- ▶ The utilisation of biogas also varies significantly across the world.
  - ▶ This ranges from the millions of small scale biogas plants to provide gas for cooking in China and India to electricity and upgraded bio-methane as vehicle fuel in Germany and Sweden.
  - ▶ These differences are the result of various factors such as energy prices, policies and government incentives.
  - ▶ Some countries use biogas as a tool for waste management to reduce environmental impact.
  - ▶ Where as, other countries focus on energy production and even grow energy crops to be used as substrates for biogas plants.

## Benefits of integrated biogas production:

- ▶ Integrated biogas systems are essentially zero waste systems.
- ▶ Optimal use of nature to produce energy and nutrients in a synergistic integrated cycle of profit making processes.
- ▶ The by-products of each process becomes the feedstock for another process.
- ▶ Offer multifaceted solutions above financial benefits including social and environmental advantages in terms of rural employment, income diversification and opportunities for decentralised services such as energy production.



# Multifaceted solutions of integrated biogas system





**THANKS**