

Industry 4.0 (4IR) & Agriculture 4.0: Role of Agriculture Extension Organizations



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Source: Tawhidul Islam Khan

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Objectives:

1. To understand the concepts of Industry 4.0 and Agriculture 4.0.
2. To know about the different trends and technologies under Agriculture 4.0.
3. To discuss the role of extension and municipal organisations in fostering Agriculture 4.0.

Source: Tawhidul Islam Khan

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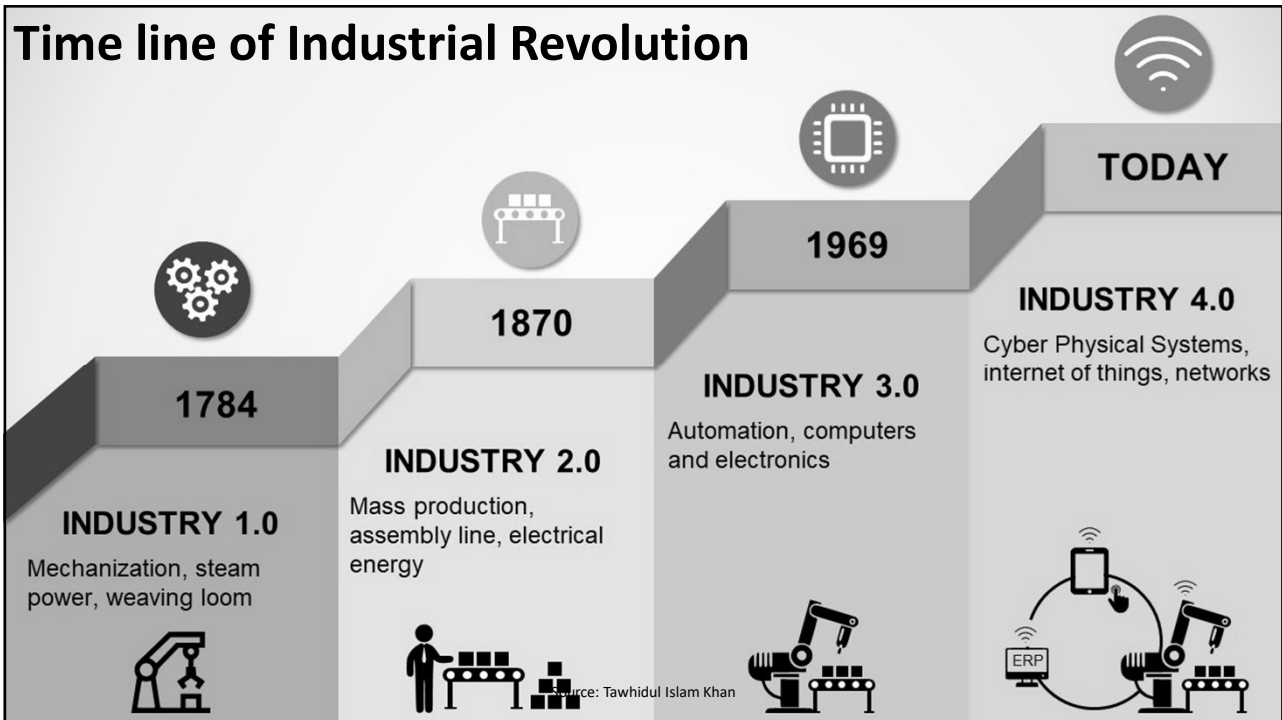
What is the Fourth Industrial Revolution?

The fourth industrial revolution is the current and developing environment in which disruptive technologies and trends such as the Internet of Things (IoT), robotics, virtual reality (VR) and artificial intelligence (AI) are changing the way we live and work.




Source: Tawhidul Islam Khan

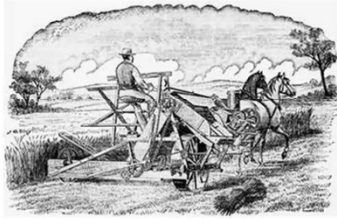
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Agricultural revolutions

Agriculture during the first industrial revolution



The first industrial revolution helped us move from an agrarian society to one where more tasks were mechanized.

In the 18th and 19th centuries, people started to move away from farms and into cities, where new types of employment were becoming available. Among the notable inventions during this period were a reliable form of steam engines, transatlantic cable and mechanical sewing machines.

- Eli Whitney invented the cotton gin in 1793 → Automation of separating cottonseed from the cotton fibre.
- Along with other inventions like the spinning jenny, it revolutionized the factory-based textile industry and boosted cotton farming.

Source: Tawhidul Islam Khan

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Agriculture during the second industrial revolution

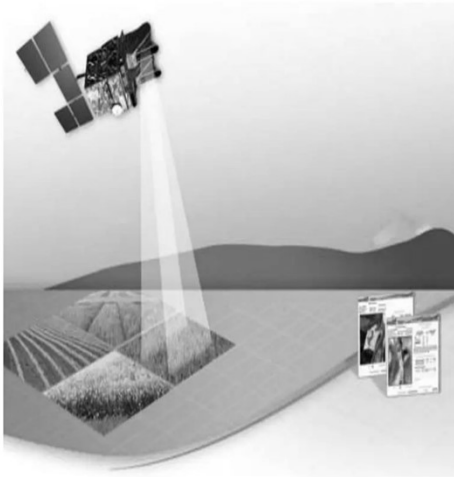


- Advances such as telephones, light bulbs, diesel engines, airplanes, the Model T and the introduction of assembly lines.
- Improvement in transportation, especially the expansion of railways, helped move crops, livestock and farming machinery, expanding markets and making farms more efficient.

Source: Tawhidul Islam Khan

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Agriculture during the third industrial revolution



- The third industrial revolution, also called the digital revolution, saw technology advancing from mechanical and analog to digital.
- Agricultural technology experienced many advances. Farmers started using HYVs, insect- and weed-resistant crops, effective fertilizers and pesticides.
- Satellite technology and biotechnology enabled farmers to increase their produce as well as record and analyse their production.

Source: Tawhidul Islam Khan

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Agriculture during the fourth industrial revolution



- Agriculture 4.0, like Industry 4.0, stands for the combined internal and external interaction of farming operations, offering digital information at all farm sectors and processes.
- Factories will become smarter, more efficient, safer, and more environmentally sustainable, due to the combination and integration of production technologies and devices, information and communication systems, data and services in network infrastructure.
- A Smart Farm must be able to adapt autonomously and in real-time to these changes in order to remain competitive on the market.

Source: Tawhidul Islam Khan

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TECHNOLOGIES USED IN SMART AGRICULTURE

- **Precision irrigation and precise plant nutrition**
- **Climate management and control** in greenhouses
- **Sensors** – for the soil, water, light, moisture, for temperature management
- **Software platforms**
- **Location systems** – GPS, satellite, etc
- **Communication systems** – based on mobile connection
- **Robotics**
- **Analytics and optimization platforms**

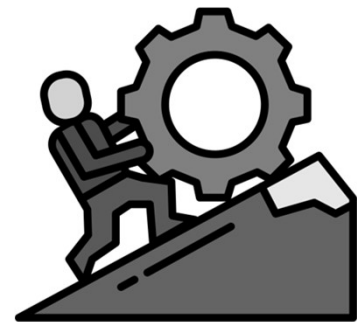
Source: Tawhidul Islam Khan



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Challenges of Implementing 4IR Technologies in Agriculture

- Financing high initial investment/cost while agriculture is dominated by smallholders
- Addressing job loss issue in rural economy
- Ensuring that revolution works for everyone
- Ensuring knowledge transfer on digital agriculture.
- Localization of technologies
- Technology transfer to the farmers
- Making the technologies feasible for farmers operate on small margins



Source: Tawhidul Islam Khan

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THE ROLE OF EXTENSION ORGANISATIONS

FOLLOW A TARGETED GOAL-ORIENTED APPROACH

- Channellize the existing capabilities
To create programs that work, don't start from scratch. Give direction, ambition, and urgency to initiatives in place.
- Partner with other agricultural organizations
Although NASA had a team of some of the best engineers in the world, 12,000 corporations were involved in making the moon project happen. Get the best possible expertise from outside to add to your own.
- Hire business development staff with knowledge on data science (UpGrad)



Source: Tawhidul Islam Khan

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- Explore cross-industry opportunities to invest in and create new solutions by merging them with agricultural activity (similar to 3D printing entering the food industry)
- Urban farmers and NGOs supporting them, have to be involved in the planning process
- Provision of training and extension services to urban producers. Emphasis on ecological farming practices, farm development (intensification and diversification), enterprise management and marketing.
- Technical advice, Urban FIGs



Source: Tawhidul Islam Khan

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Municipal strategies for the Development of Safe and Sustainable Agriculture 4.0

1) Creating a conducive policy environment

- Formal acceptance of urban agriculture as an urban land use.
- In Lima, Peru an urban agriculture sub-department has been created under the Department of Economic Development.
- In Bulawayo, Zimbabwe, an Interdepartmental Committee on Urban Agriculture was created to coordinate the activities of the various Municipal departments active in this field including the Departments of Town planning, Health, Finance, and others.

Source: Tawhidul Islam Khan



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3) Enhancing access of urban farmers to credit and finance

- Municipalities can stimulate (e.g. by creating a guarantee fund) existing credit institutions to establish special credit schemes for urban producers or to allow the participation of urban producers
- The inclusion of urban agriculture in the municipal budget

4) Facilitate (direct-)marketing

- Authorize food box schemes and/or support the establishment of “green labels” for ecological grown and safe urban food.



Source: Tawhidul Islam Khan

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5) Supporting micro-enterprise development

- Suppliers of farm inputs (compost, earthworms, open pollinated seeds and plant materials, bio-pesticides).
- Processing enterprises (food preservation, packaging, street vending, transport).
- By provision of start-up licenses and subsidies or tax reductions to micro- and small entrepreneurs.



Source: Tawhidul Islam Khan

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Thanks All

Source: Tawhidul Islam Khan

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