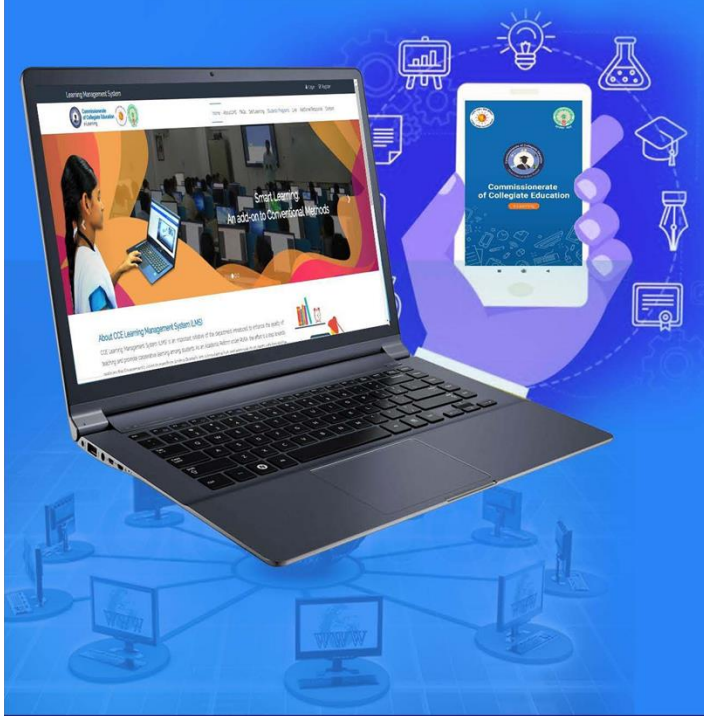
GOVERNMENT OF ANDHRA PRADESH

COMMISSIONERATE OF COLLEGIATE EDUCATION



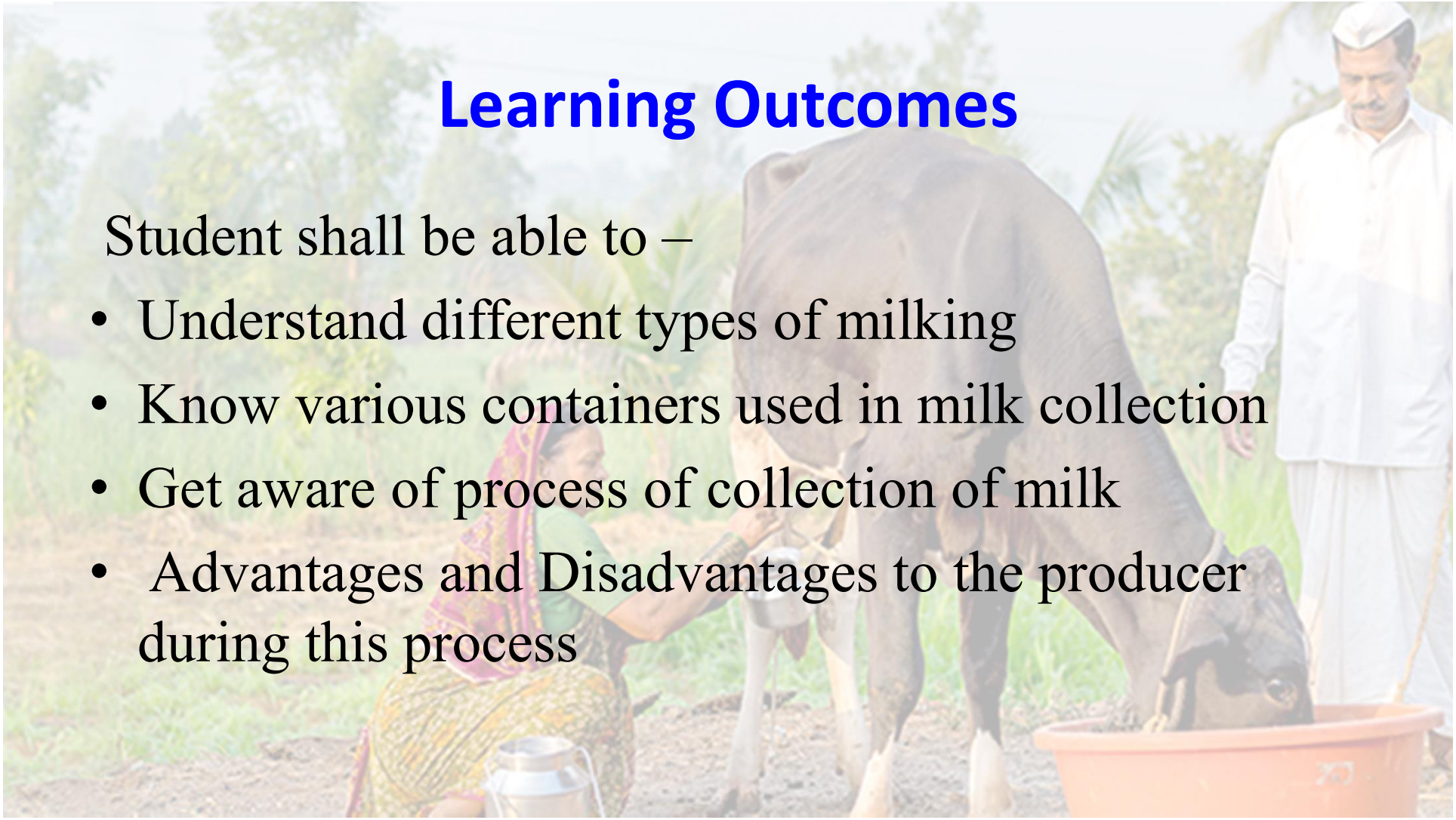
Methods of Collection of Milk

Dairy Technology

Zoology

B.R.K KISHORE

LECTURER IN ZOOLOGY
SGKGDC VINUKONDA



Learning Outcomes

Student shall be able to –

- Understand different types of milking
- Know various containers used in milk collection
- Get aware of process of collection of milk
- Advantages and Disadvantages to the producer during this process

Why Milk has to be Collected?

- Milk production, in most of the countries particularly, developing countries, is confined to rural/hinterland areas; while demand for milk and dairy products is mostly urban in nature due to obvious reasons.
- Hence, milk has to be collected, transported and marketed from villages to towns/cities for better return.

Methods of Collection of Milk

- Collection from Cattle
- Collection from Producer
- Collection through Agents / Middle men
- Collection from Government Agencies

Collection from Cattle

- The process of collection of milk from the udder of the cattle is called as - Milking

https://www.researchgate.net/figure/Illustration-of-the-three-hand-milking-techniques-compared-in-the-hand-milking-technique_fig2_40873287

Methods of Milking

- **Hand Milking** –
  - » Wet Hand Milking
  - » Dry Hand Milking
    - Full Hand Milking
    - Stripping
    - Knuckling / Fisting
    - Pinching
- **Machine Milking**

Methods of Milking

Preparing for Milking

(Video by - The University of Edinburgh)

https://www.youtube.com/watch?v=gc7vtWH_ybA

Good Milking Practice
(Video by - The University of Edinburgh)

https://www.youtube.com/watch?v=fhabl9vtb4U&t=58s

Hand Milking

- It is the most common process in India.
- Cows are milked from left side.
- Teats may be milked diagonally or forequarters together and then hind quarters together.
- The milk must be squeezed and not dragged out of teats in order to prevent injury to teats.

Hand Milking …

- The first few strips of milk from each teat are let on strip-cup to check for possible incidence of mastitis.
- It also helps in discharging out of bacteria which have accessed and collected in teat canal.

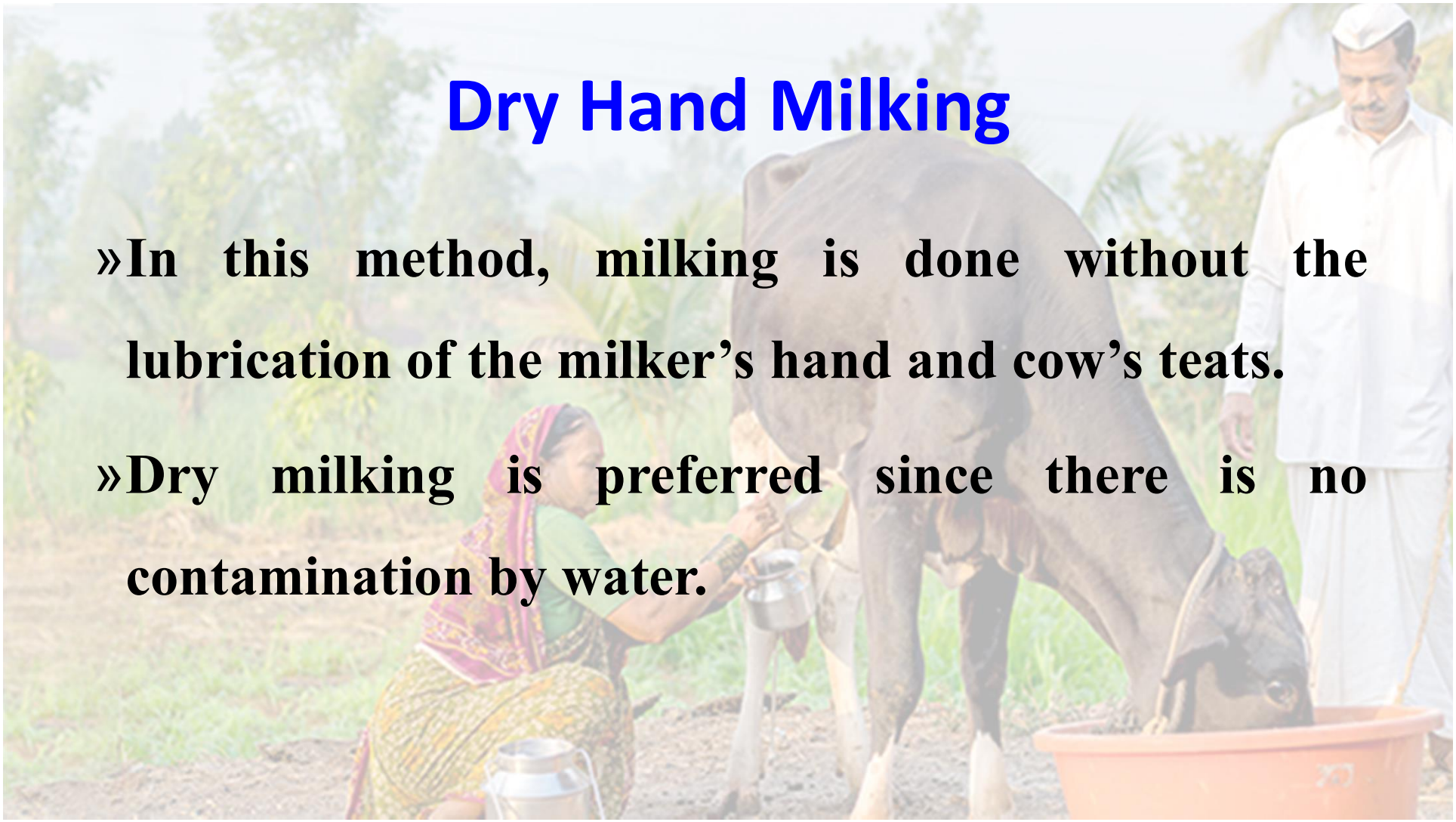
Hand Milking

- It is of 2 types:
  - » Wet hand milking and
  - » Dry hand milking

Wet Hand Milking

- **It is done by lubricating the milker's hand and cow's teat with either water or oil.**
- **Wet milking after wetting the udder is not advisable as water itself may be a source of contamination and in addition, it makes the teats dry and chaffed with the appearance of cracks and sores on the udder.**

Dry Hand Milking



- In this method, milking is done without the lubrication of the milker's hand and cow's teats.
- Dry milking is preferred since there is no contamination by water.

Types of Dry Hand Milking

Full Hand Milking

Stripping Method

Knuckling Method

Pinch & Squeezing

Full Hand Milking

Stripping Method

- **Stripping consists of firmly seizing the teat at its base between the thumb and forefinger and drawing them down.**
- **The entire length of the teat is pressed simultaneously to cause milk ejection and to flow down in streams.**
- **The process is repeated in succession.**

Stripping Methd …

YouTube Video on Stripping Method

https://www.youtube.com/shorts/uCO2q6YwU5I

Knuckling Method

YouTube Video on Knuckling Method of Milking

https://www.youtube.com/shorts/rRSX8Wh0FDA

Pinch & Squeezing

YouTube Video on Pinch & Squeezing Method

https://www.youtube.com/watch?v=7S_WDGib_D0

Machine Milking

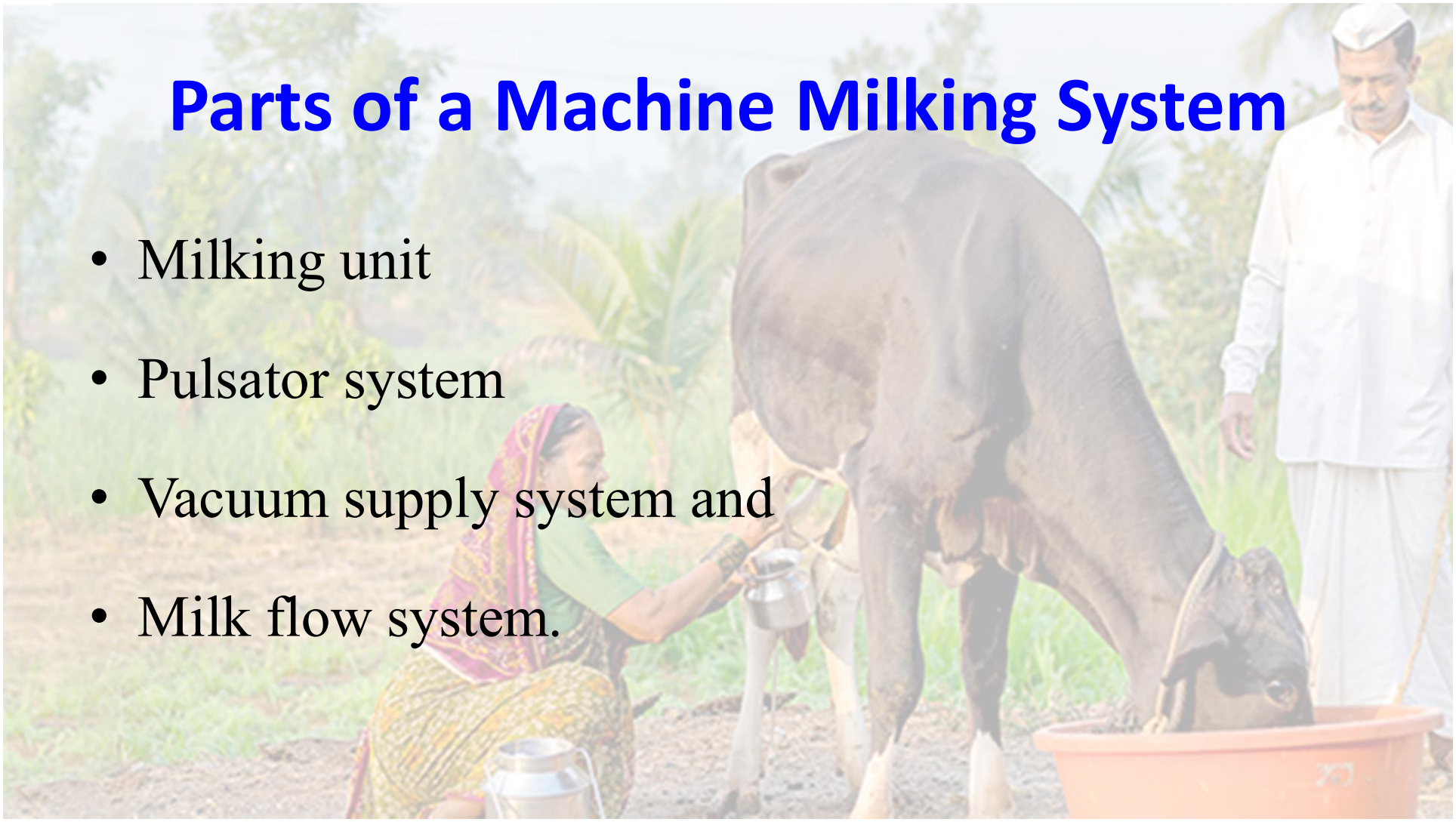
- Milking is done by using machine
- Adopted for herds with large number of cows and with high yielders.
- The milk flow is continuous in this method.

Advantages of Machine Milking …

- Reduced labour cost
- Short time for milking
- Less injury to teats
- Hygienic method of milk production

Parts of a Machine Milking System

- Milking unit
- Pulsator system
- Vacuum supply system and
- Milk flow system.

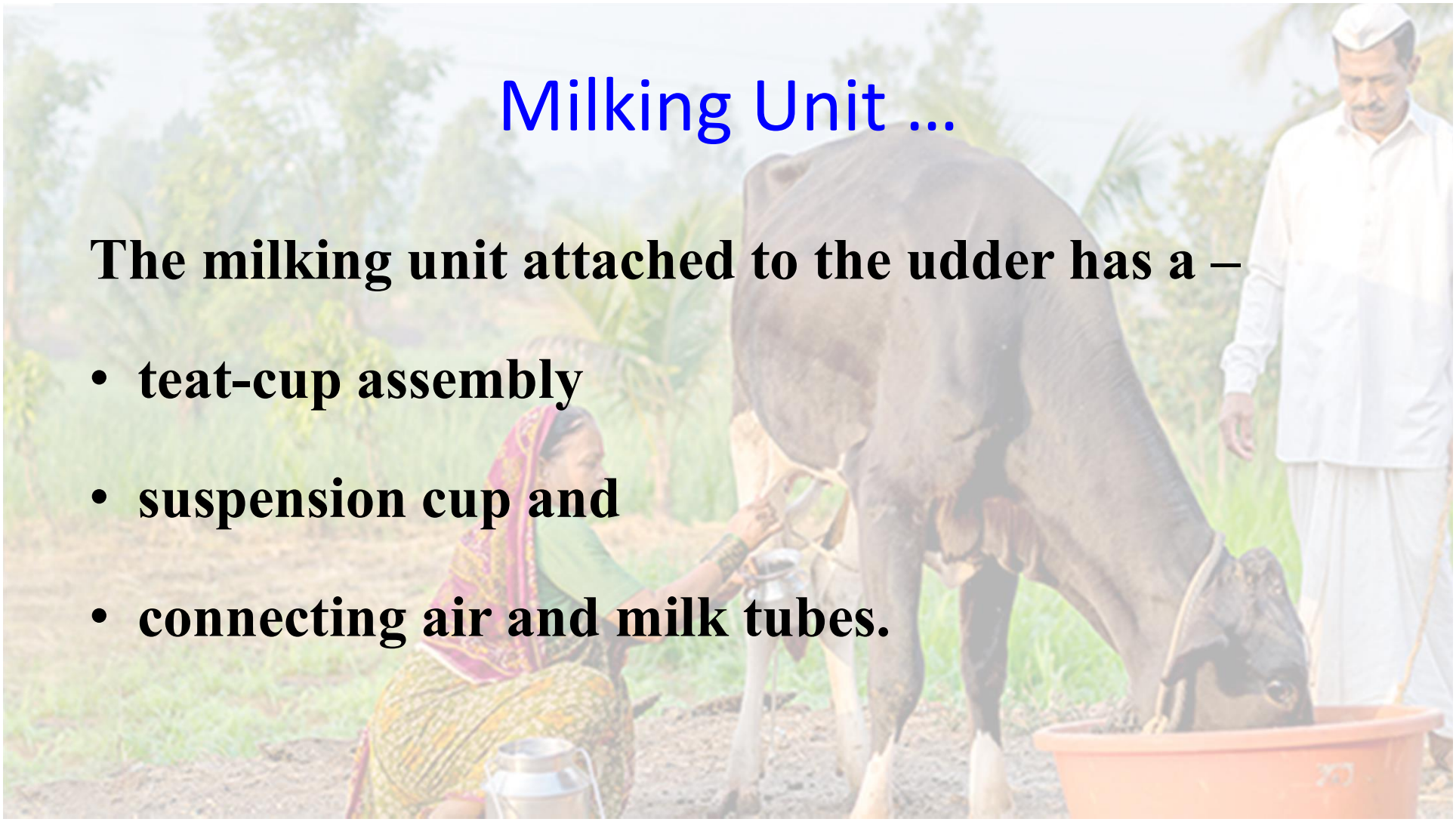


Machine Milking

Milking Unit …

The milking unit attached to the udder has a –

- **teat-cup assembly**
- **suspension cup and**
- **connecting air and milk tubes.**



Milking Unit …

https://www.youtube.com/watch?v=UPVKMtQ9rlI

Process of Machine Milking …

- **The teat cup consists of a steel shell with a liner which fits over teats called as inflation.**
- **The inflation squeezes and relaxes on the teat as the pulsator operates causing the milk to flow into the system.**
- **The pulsation ratio is the time between milking and resting phases of pulsation cycle.**

Process of Machine Milking …

- **The pulsation ratio refers to the number of pulsations per minute.**
- **The pulsation ratio usually varies from 1:1 to 2.5:1.**
- **Set the pulsation rate around 48 to 72 cycles per minute to avoid excessive slow or fast speed and subsequent decline in milk flow rate.**

Process of Machine Milking …

- **Always maintain the measure of vacuum by operating the milking machine between 10 and 16 inches of Hg.**
- **Apply milking machine gently within 30 to 60 seconds of washing of udder.**

Process of Machine Milking …

- **Remove milking machine promptly as soon as milk flow stops by breaking vacuum first.**
- **Disinfect the teat ends by dipping them in antiseptic solution. Milk utensils and teat cups are immediately washed with warm water.**

Advanced Milking – Robot Milking

https://www.youtube.com/watch?v=tLjI_eixBQk

Modern Dairying …

https://www.youtube.com/watch?v=p_rtdPtdmAU

YouTube Video on Milking Methods Explained in Telugu

https://www.youtube.com/watch?v=Up9TiQPdV3A&t=168s

METHODS OF COLLECTION OF MILK

YouTube Video on Milk Collection System in India

https://www.youtube.com/watch?v=Q_PEGMbBCro&t=14s

Milk Shed

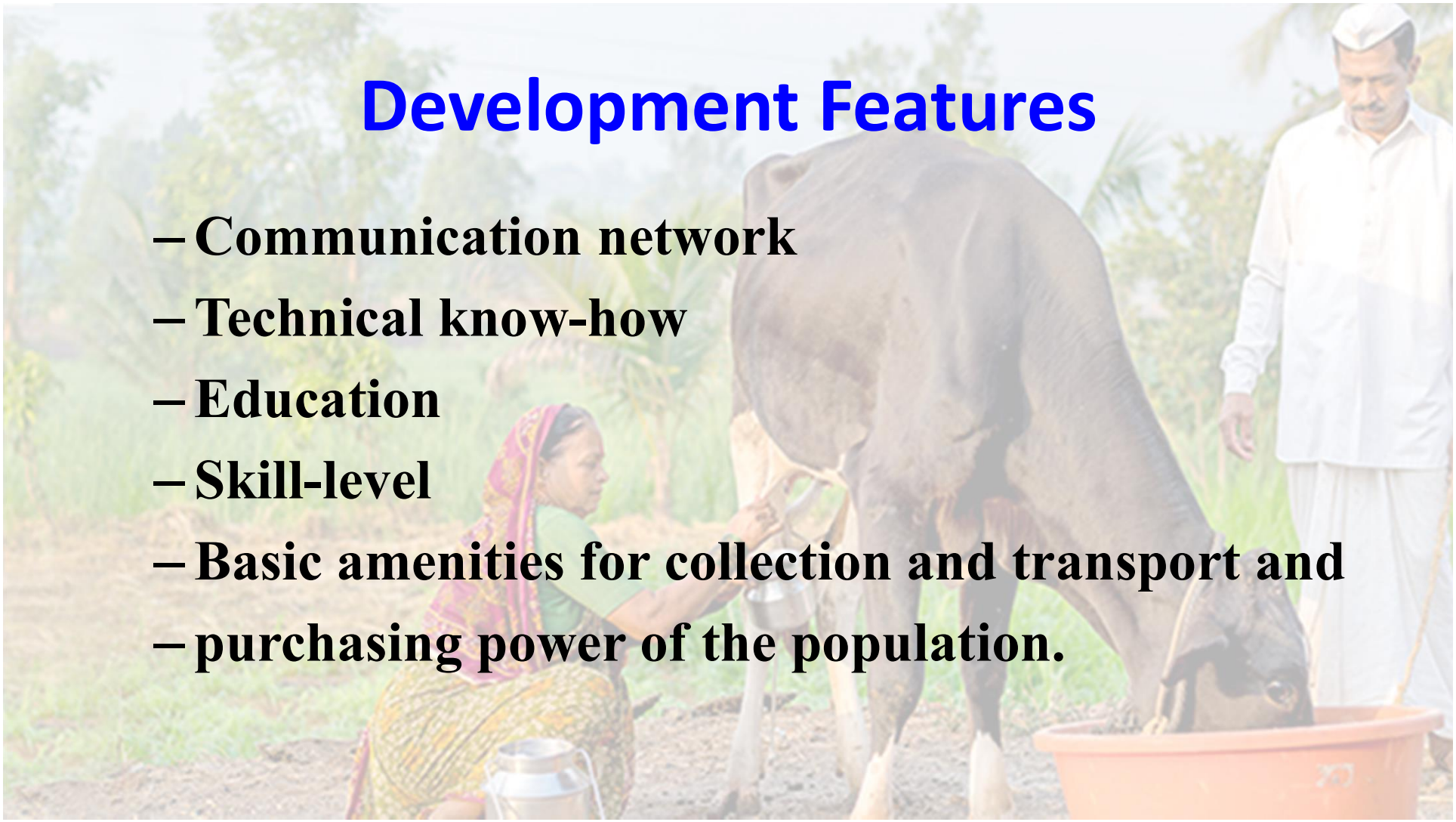
- **Milk is collected from Milk Sheds**
- **Milk shed is the geographical area from which a city dairy receives its fluid milk supply.**
- **Handling of milk during collection is to be done with utmost care.**
- **The ultimate aim of every collection system is to provide regularly "safe" milk for the processing units and/or the customers to meet their demand at economical cost.**

Climatic Conditions …

- **temperature and humidity and seasonal variations play an important role in planning a suitable milk collection system.**
- **High climatic temperature and humidity conditions are very much conducive for the growth of micro-organisms.**
- **Usually, a chilling component needs to be installed at collection point, if not done at production point, to bring down the temperature of milk to below 40°C within 4 hours of after milking.**

Development Features

- Communication network
- Technical know-how
- Education
- Skill-level
- Basic amenities for collection and transport and
- purchasing power of the population.



Distance of Dairy Plant

- If milk is supplied to large dairy plants over a long distance from the production site, a milk collection centres are established to collect sufficient milk to justify a call for lorry or tanker.
- Intermediate collection points are more likely to be required when milk has to be collected from a low-density production area at a long distance.

Milk Containers

- Various types of containers made of different materials, sizes, shapes and designs are used in milk handling at

1. pick up-points
2. collecting centres
3. collecting and cooling centres and
4. for delivering to the processing plant.

Materials used for Milk Containers

- Wood
- food quality grade plastic
- porcelain, glass
- Steel
- aluminium alloys
- metal or enamel-coated metal
- copper plated steel

Containers on the Farm

- Milking machine
- Milking pail
- Weight balance
- Storage milk cans
- Bulk storage tank
- Can cooling system
- Milk sampling and testing unit

https://www.freepik.com/free-vector/milk-containers-realistic-set_5971322.htm

Cotainers at the Farmer's Site

- Types of containers in use at farmers' house are:

1. Buckets made of galvanized iron, brass, aluminium, stainless steel etc.,
2. Milking pail of galvanized iron,
3. Baked earthen pots,
4. Pitcher of brass, earth or copper,
5. Tumbler, jug etc., and
6. Second hand package container of tin, plastic etc

Milk Pail

https://www.flickr.com/photos/internetarchivebookimages/20548252278/

Milk Can/ Bucket

https://www.turbosquid.com/3d-models/3d-metal-bucket-milk-model-1233059

Galvanized Can

Containers at Pick-up Points

- At the point, sometimes milk from many farmers is pooled into fewer and larger containers.
- Use of standard containers reduces the time of weighment of milk of the individual farmers/suppliers.

Containers at Cooling Centre

– Milk from small-scale farmers is collected daily once or twice, and delivered to a processing plant.

–Evening milk is collected, cooled and held cold overnight for delivery to the processor together with the following day's morning milk.

–The final delivery of milk to the processor is done mainly in 40-50 litre aluminium alloy cans or in bulk tanks.

Bulk Milk Collection Containers

– Bulk milk collection is carried out either in 40-50 litres cans loaded on lorries or pick up or it may be collected using bulk pick up road tankers where the infrastructure allows.

– Single wall cans are usually used. In few cases, insulated cans are used.

– After delivery, the processor washes and sanitizes the cans and returns to the collection and/or cooling centre.

Organization & Types of Milk Collection

- Organization of milk collection involves –

1. identifying the milk shed
2. establishing a milk collection point
3. deciding a milk collection route
4. recruitment of staff
5. cleaning of the utensils
6. maintaining hygiene and sanitation standards as prescribed by the government

Milk Collection System …

- A number of milk collection system have been developed and are being used throughout the world to provide market to the milk producers and obtain sufficiency of milk for processing plant.

1. Direct from the Producer

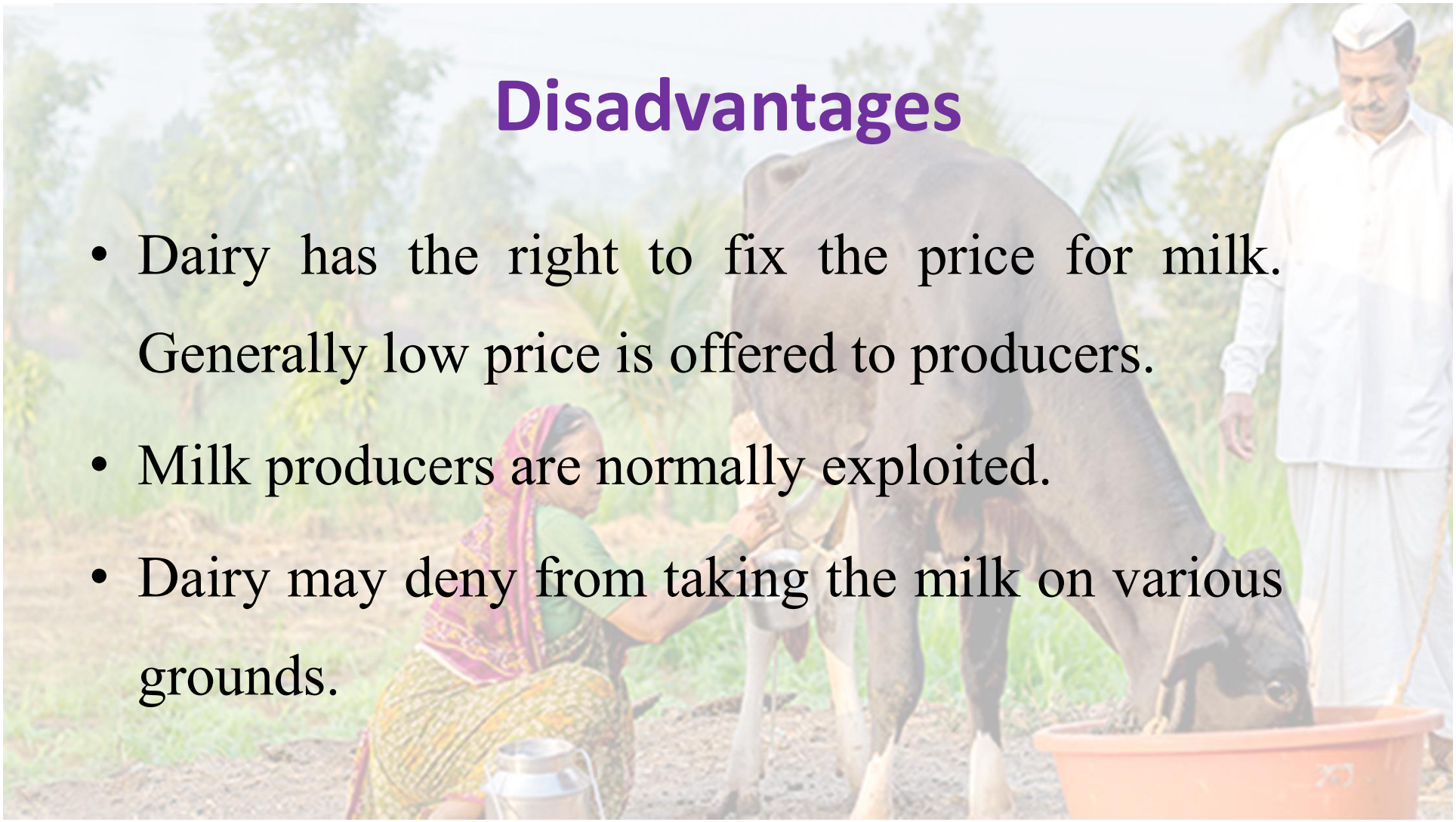
– The individual producer brings milk and delivers to the dairy plant independently.

– This practice generally suits the large producers located near the processing plant.

– There is no obligation of any kind on either side.

Advantages …

- **Quality control can be performed in the presence of the producer**
- **Adulterations can be dealt within the presence of the supplier**
- **Additional job opportunities among rural people can be created**



Disadvantages

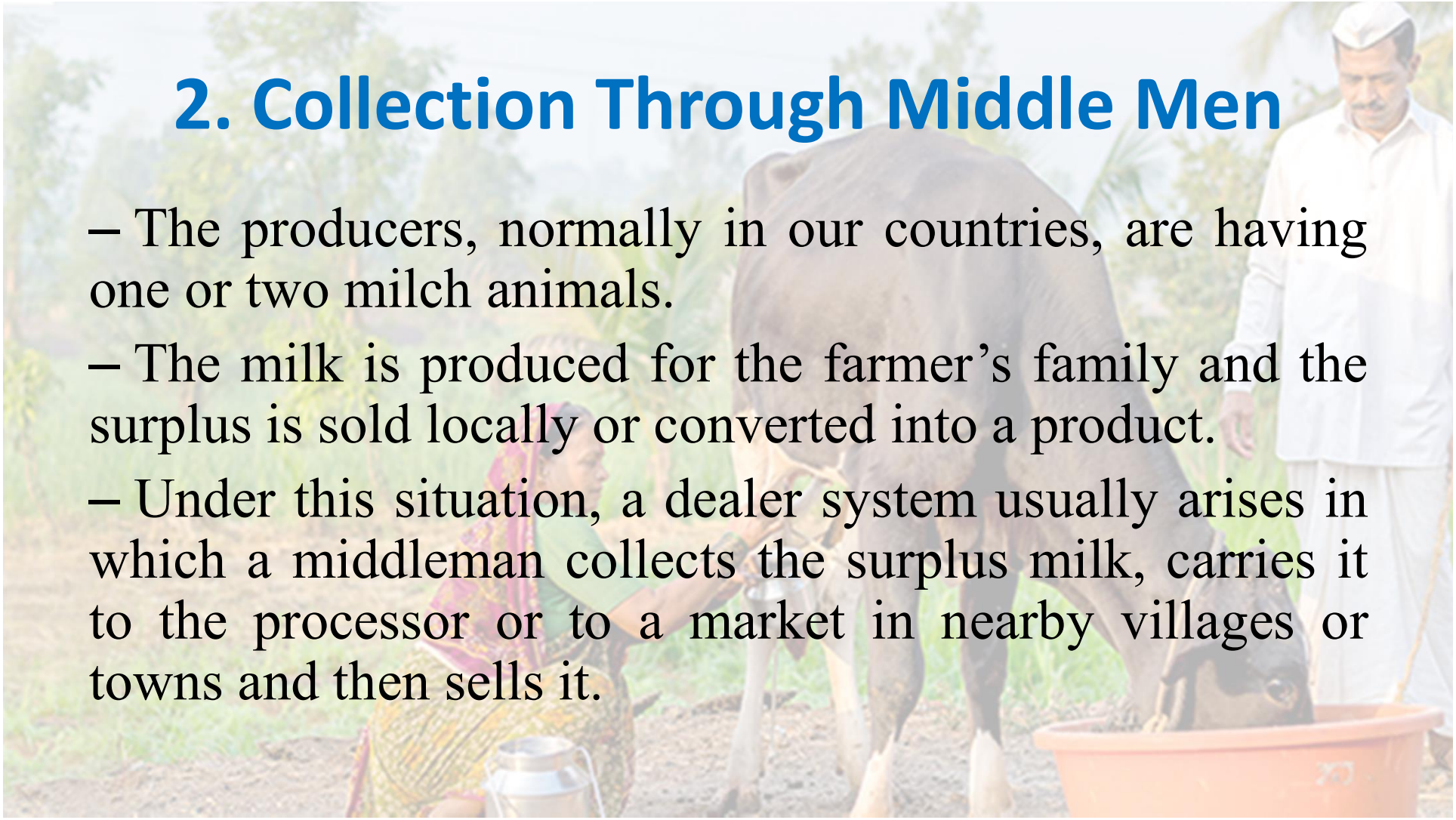
- Dairy has the right to fix the price for milk. Generally low price is offered to producers.
- Milk producers are normally exploited.
- Dairy may deny from taking the milk on various grounds.

Disadvantages …

- There is no assured market for the milk throughout the year.
- The dairy because of seasonal variations may not accept all the milk supplied by the producers.
- Producers do not get incentive for increasing milk production.

Disadvantages …

- **No facilities to increase milk production are provided by dairy**
- **social and economic needs of the farmers are not taken care of.**
- **The profits earned by the dairy are not shared with milk producers.**

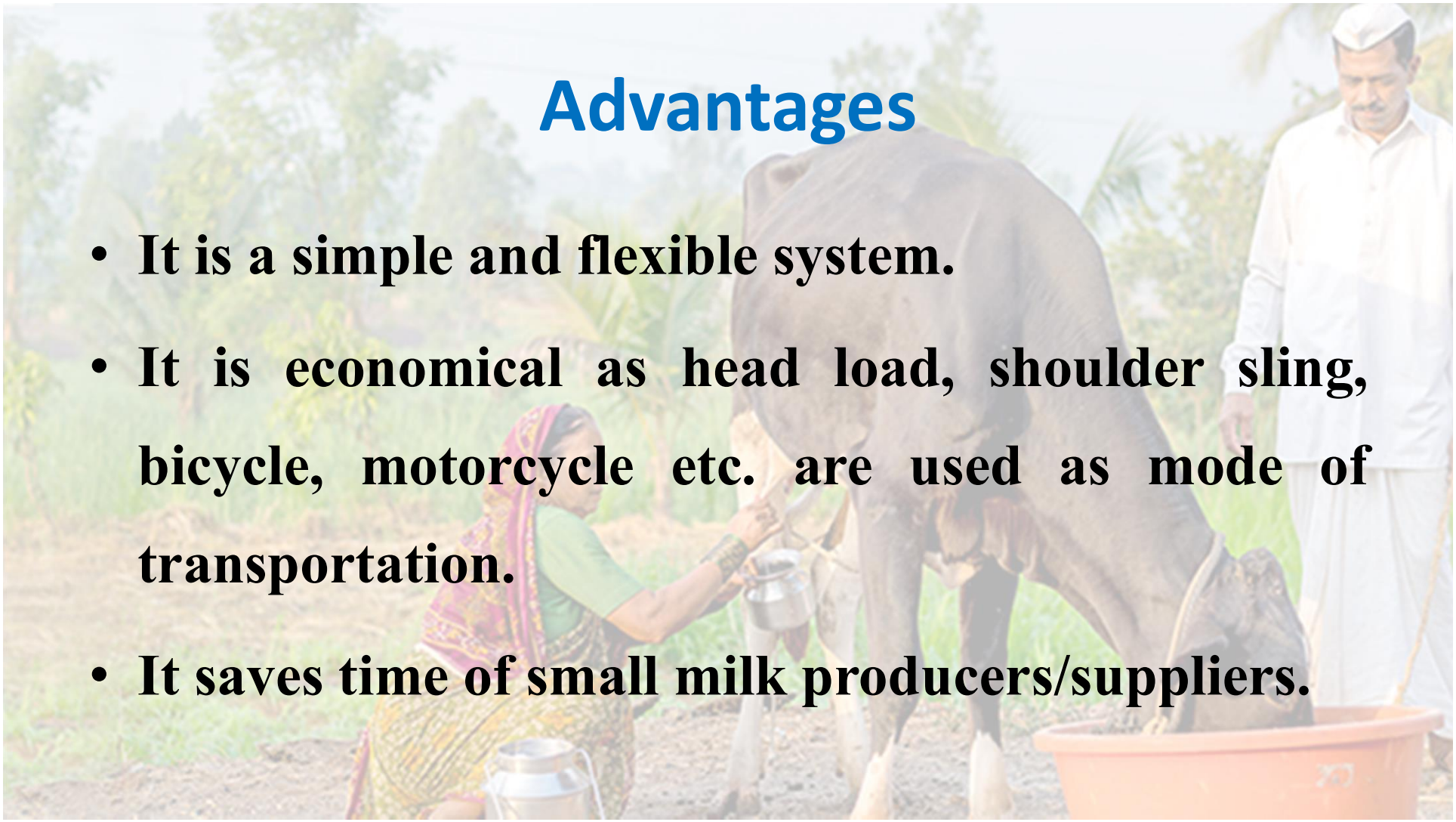


2. Collection Through Middle Men

– The producers, normally in our countries, are having one or two milch animals.

– The milk is produced for the farmer's family and the surplus is sold locally or converted into a product.

– Under this situation, a dealer system usually arises in which a middleman collects the surplus milk, carries it to the processor or to a market in nearby villages or towns and then sells it.



Advantages

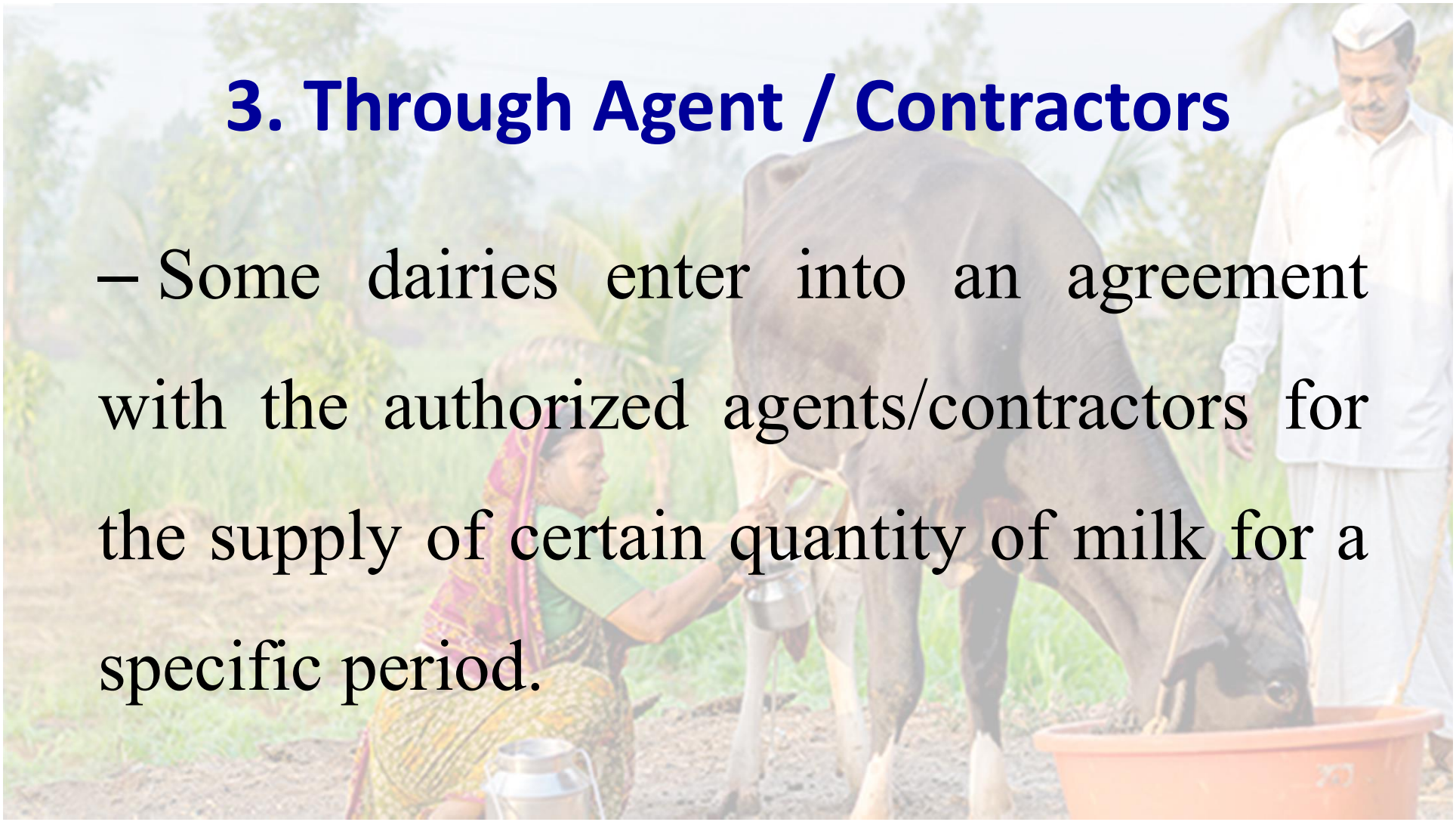
- **It is a simple and flexible system.**
- **It is economical as head load, shoulder sling, bicycle, motorcycle etc. are used as mode of transportation.**
- **It saves time of small milk producers/suppliers.**

Disadvantages

- **Milk is usually of poor quality.**
- **More proximity of using preservatives, neutralizer etc.**
- **Milk could be supplied to limited distance.**
- **Price for the milk received by the producer is very low.**

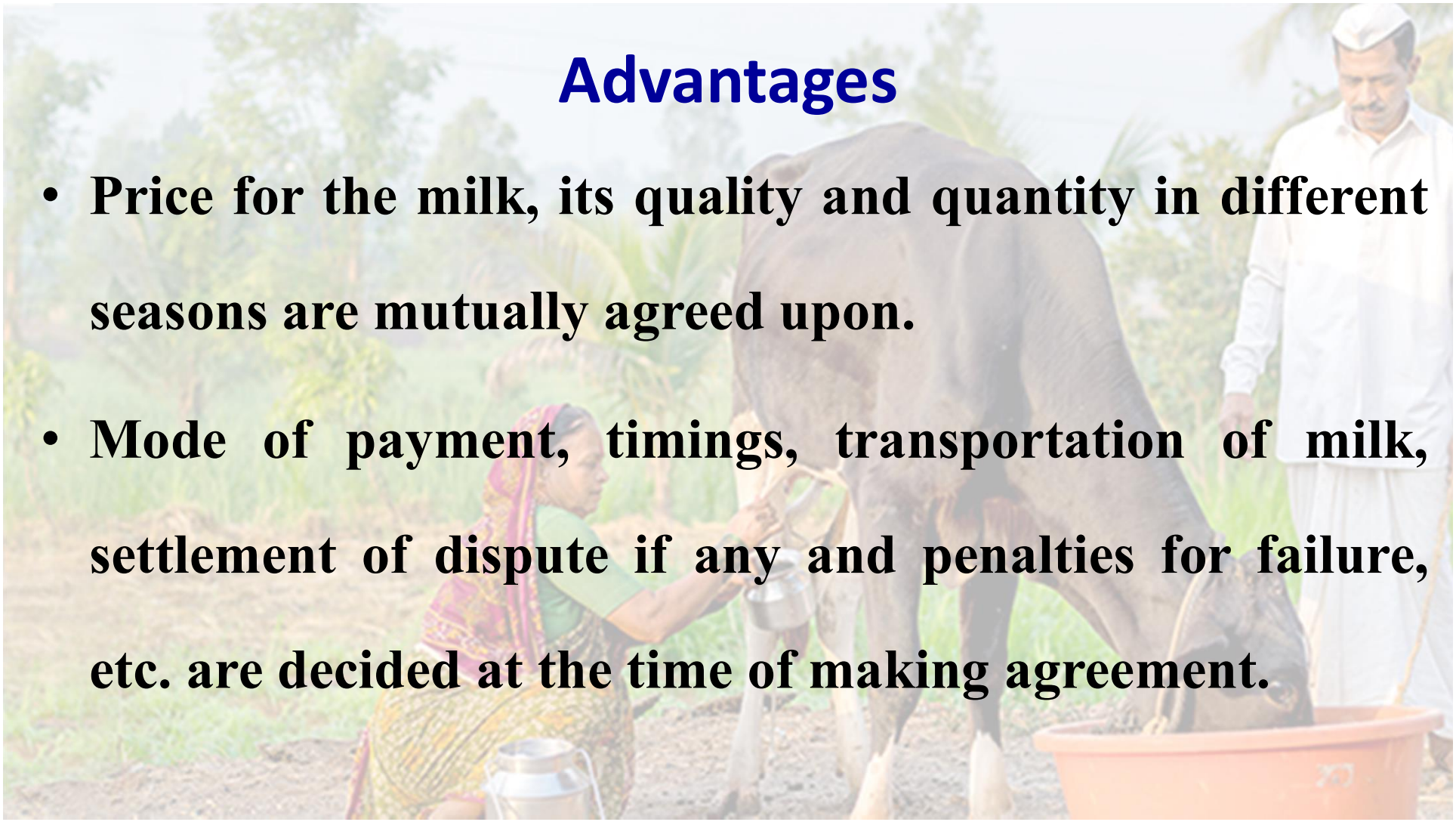
Disadvantages …

- **Producers do not get any incentive or help for milk production.**
- **Sometimes, milk producers are given loan for purchase of milch animals with the agreement that the milk produced will have to be sold to the lender only on his fixed price.**
- **Milk producer, generally, remains a debtor.**



3. Through Agent / Contractors

– Some dairies enter into an agreement with the authorized agents/contractors for the supply of certain quantity of milk for a specific period.



Advantages

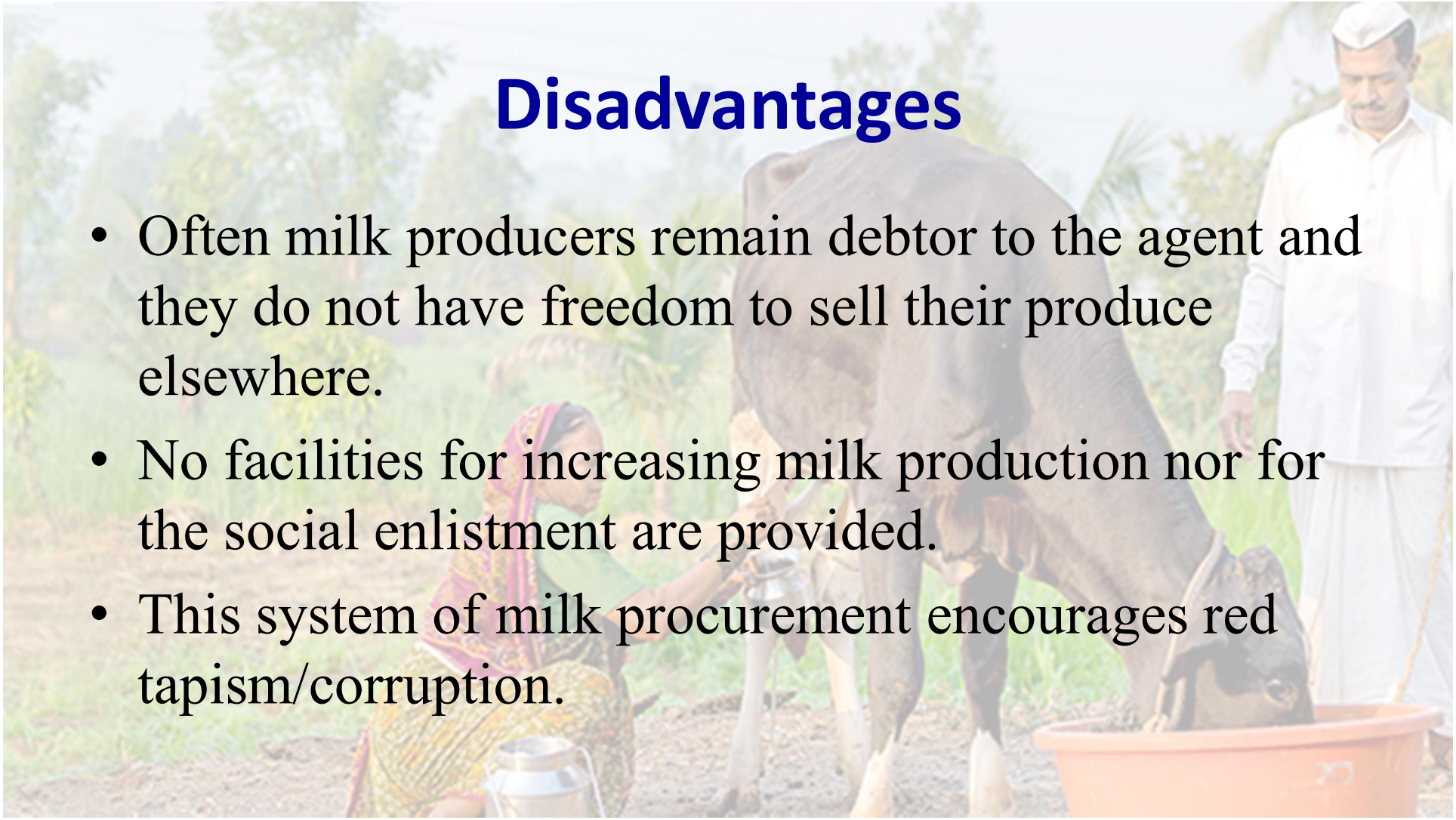
- **Price for the milk, its quality and quantity in different seasons are mutually agreed upon.**
- **Mode of payment, timings, transportation of milk, settlement of dispute if any and penalties for failure, etc. are decided at the time of making agreement.**

Advantages

- **Contractors make their own arrangement to collect, chill and transport the milk in cans, tankers, bulk tanks, etc. by their own vehicles.**
- **Dairy is no way concerned with milk production and management of milk collection, transportation and incurring expenses on it.**
- **Dairy has not to deal with large number of producers but only a few contractors.**

Disadvantages

- Milk producers are, invariably, exploited by the contractors and the dairy as well.
- Quality of milk, in general, is poor, adulterated and fabricated. Once becoming dependent on the supply of milk by contractors, dairy yields to their dictat.
- Producers get very low price for milk and profits are taken by the contractors.



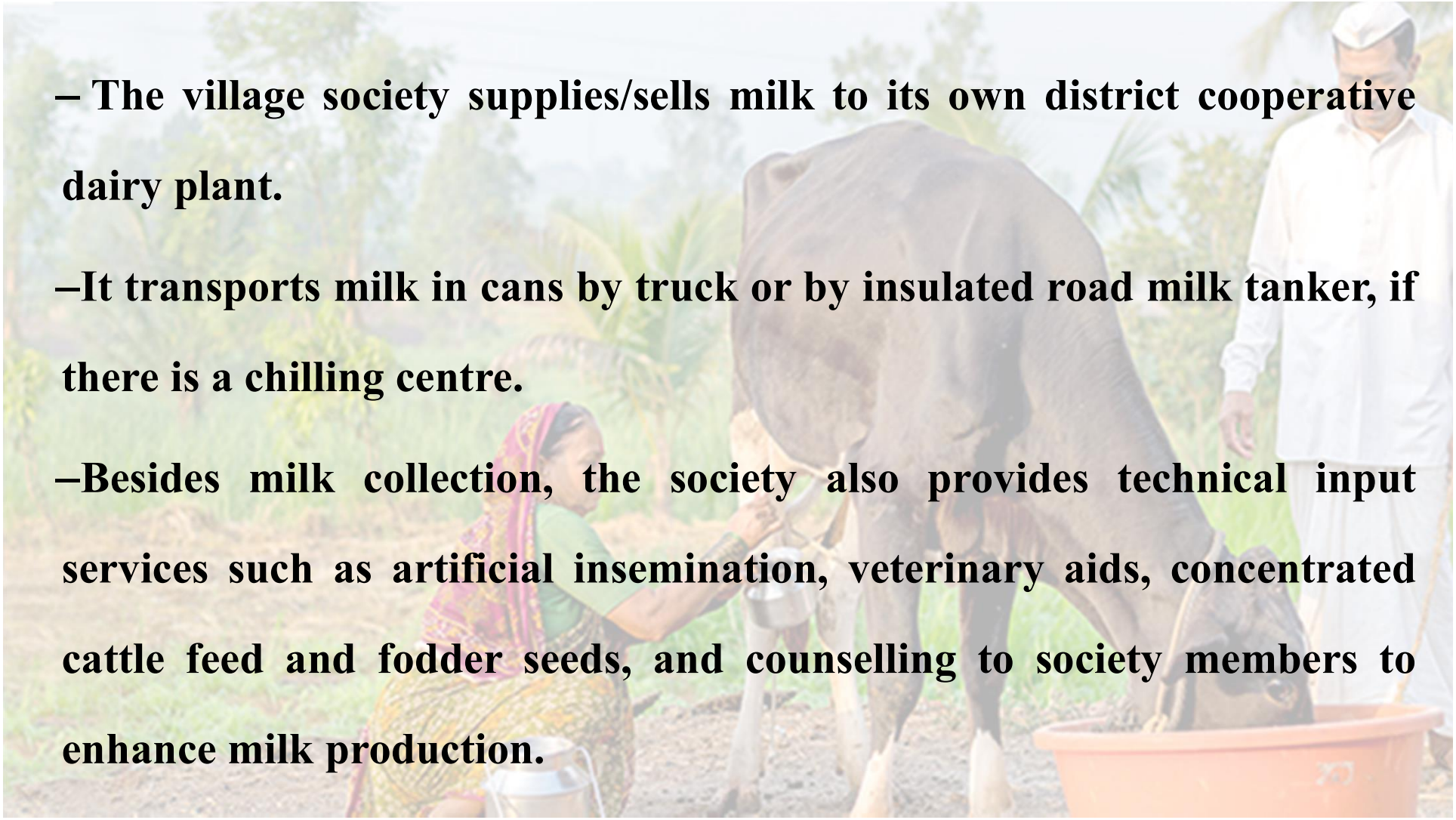
Disadvantages

- Often milk producers remain debtor to the agent and they do not have freedom to sell their produce elsewhere.
- No facilities for increasing milk production nor for the social enlistment are provided.
- This system of milk procurement encourages red tapism/corruption.

4. Through Cooperatives

– At the village level, farmers organize themselves in a cooperative society, which establishes milk collection centres.

– The society members deliver milk twice a day to the milk collection centres where milk is weighed/measured, tested, and price is paid to farmers according to its quantity and quality.



– The village society supplies/sells milk to its own district cooperative dairy plant.

–It transports milk in cans by truck or by insulated road milk tanker, if there is a chilling centre.

–Besides milk collection, the society also provides technical input services such as artificial insemination, veterinary aids, concentrated cattle feed and fodder seeds, and counselling to society members to enhance milk production.

Advantages

- The milk producer is the owner of the dairy.
- He has the right to decide the price of milk and also to get the share of profit made by the dairy.
- This system gives self-reliance to the producers for solving their problems in a collective manner.
- This is a foolproof system to eliminate all the demerits of other types of milk collection.

5. Collection from Chilling Plants

– **Improvement in refrigeration and transportation facilities has made possible to procure milk in bulk quantities from distant places.**

– **One dairy situated at thousand kilometers away can get milk from another dairy in good condition.**

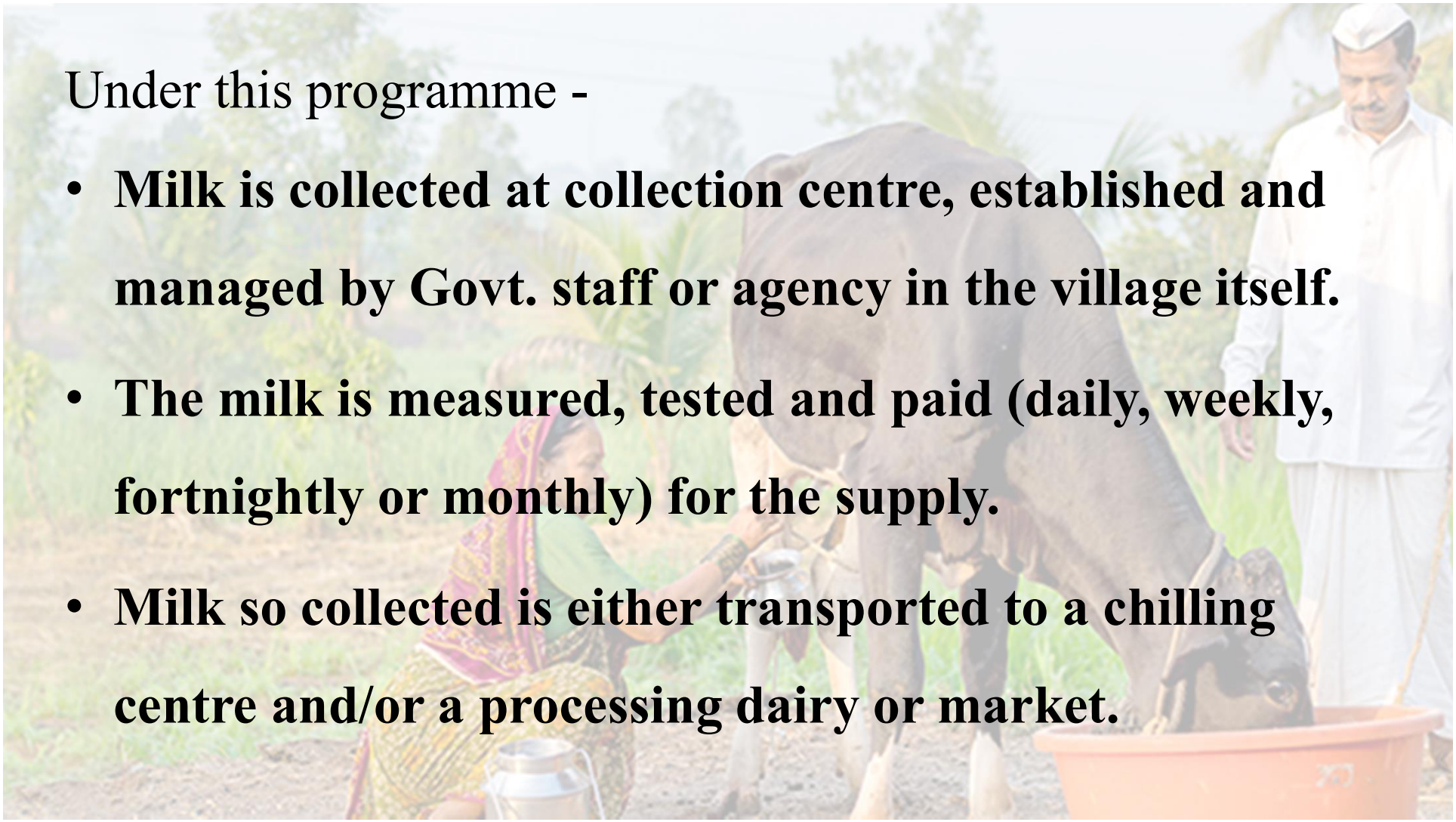
Collection from Chilling Plants

– **The milk is either chilled or processed and chilled to a temperature just above 4°C and transported through road/rail tankers (insulated or refrigerated) depending upon the distance and volume of milk.**

– **Milk at the receiving dairy is usually reprocessed, packaged and delivered to the consumers.**

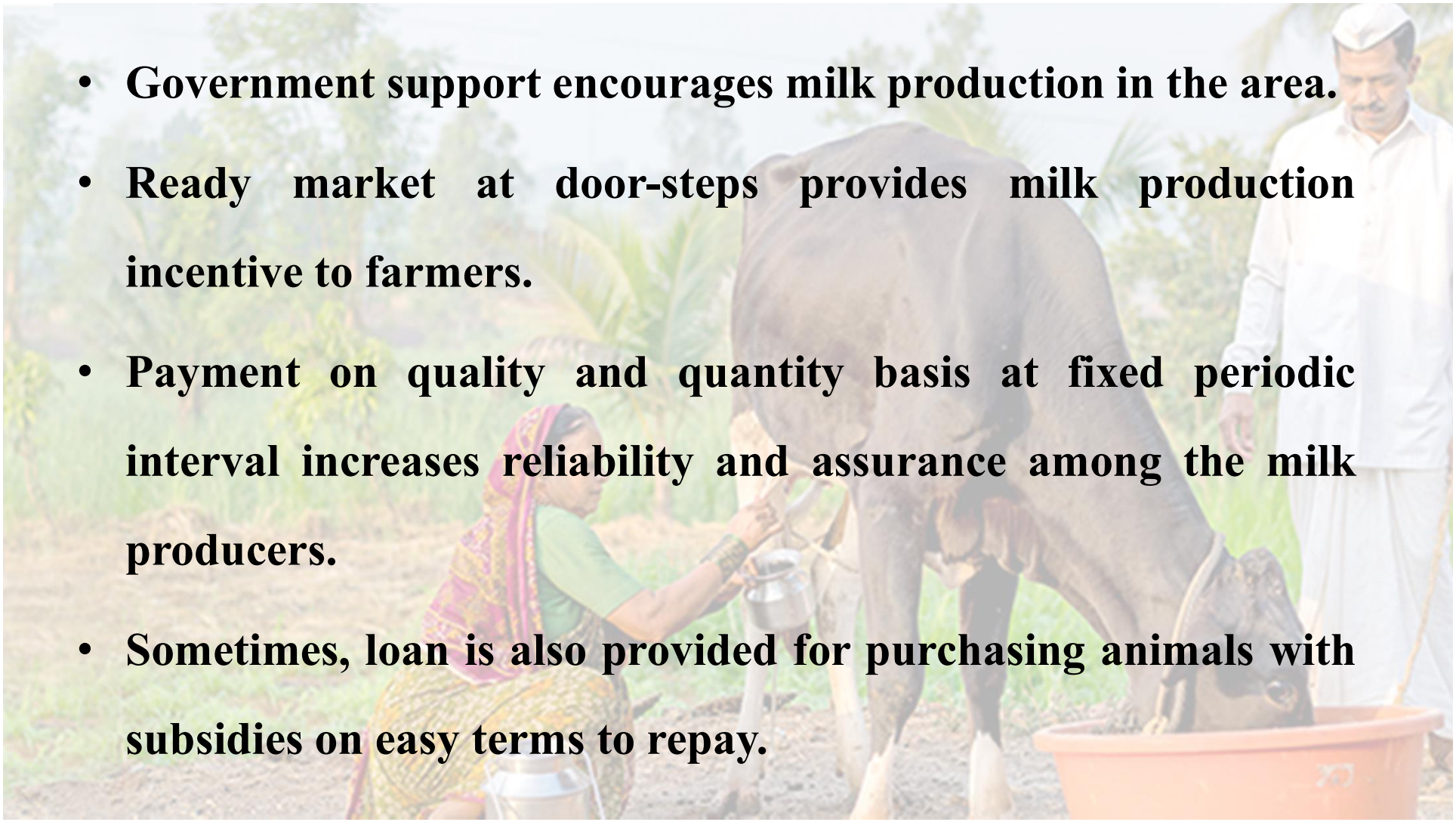
6. Through Government Agencies

- Dairying is being considered as an instrument of social upliftment.
- Hence, in areas, regions, states or countries, where dairy development is still under infancy, Government is providing all sorts of inputs to help farmers to adopt dairy farming by providing ready market for their produce i.e. milk.



Under this programme -

- **Milk is collected at collection centre, established and managed by Govt. staff or agency in the village itself.**
- **The milk is measured, tested and paid (daily, weekly, fortnightly or monthly) for the supply.**
- **Milk so collected is either transported to a chilling centre and/or a processing dairy or market.**



- **Government support encourages milk production in the area.**
- **Ready market at door-steps provides milk production incentive to farmers.**
- **Payment on quality and quantity basis at fixed periodic interval increases reliability and assurance among the milk producers.**
- **Sometimes, loan is also provided for purchasing animals with subsidies on easy terms to repay.**


Thank You