5.1

AGRONOMY IN SPATE IRRIGATION

AGRONOMY IN SPATE IRRIGATION

Traditionally Spate irrigation supports low value agriculture:

- Uncertainties in timing, number and sizes of floods
- Damage to irrigation structures
- High risk of crop failure

But there is variation ----

- Have high value – taste, preferences, multipurpose, environmental value, Inputs, organic

Cropping strategies

Farmers developed several cropping strategies:

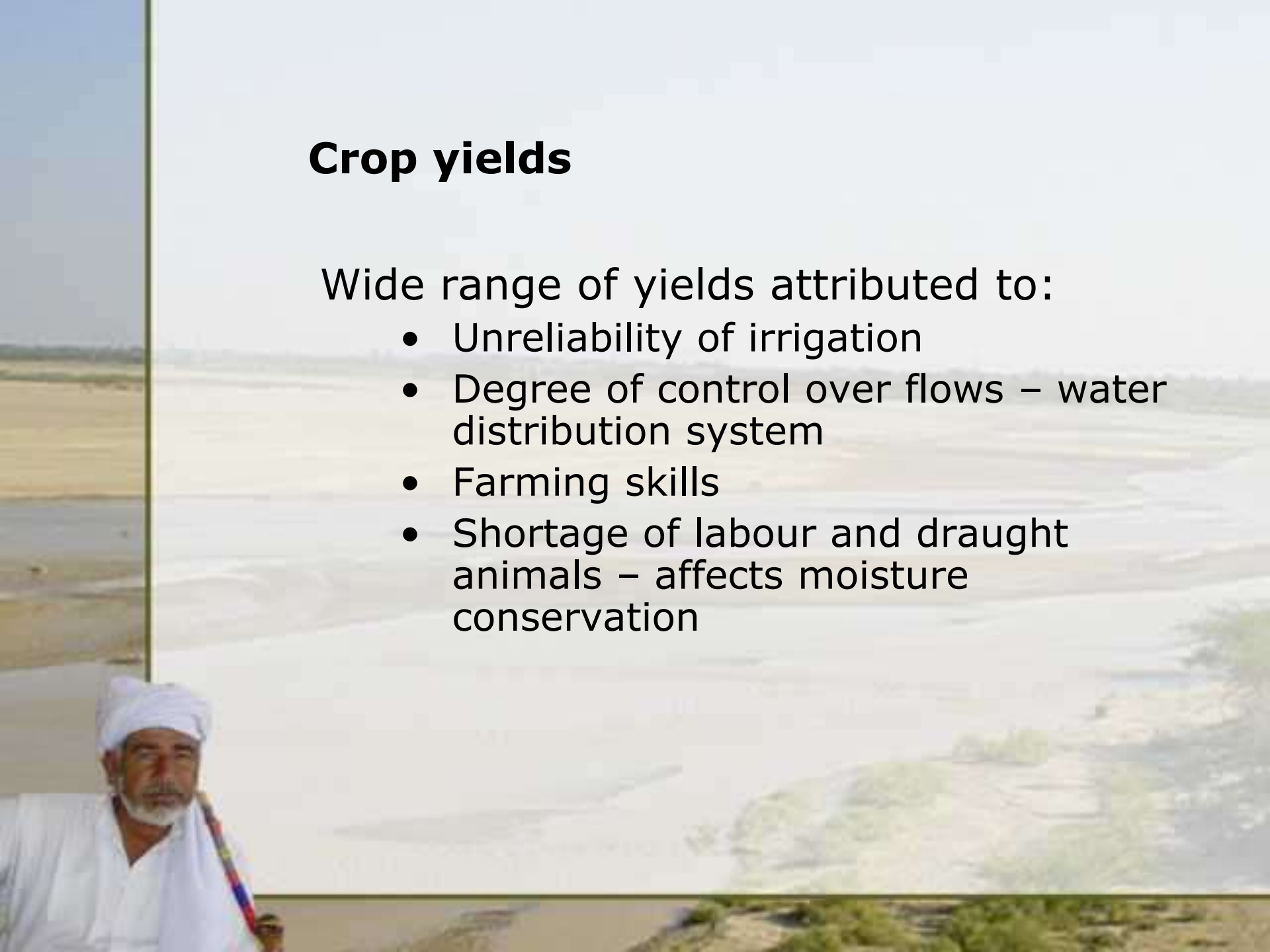
- Crop choice determined by timing and volume of irrigation
- Moisture conservation
- Preference for local varieties
- If crop fails, use for fodder
- Intercropping

Preference for deep rooting (+3 meter) crops, such as oilseeds, cotton and sorghum.

Crop yields

Wide range of yields attributed to:

- Unreliability of irrigation
- Degree of control over flows – water distribution system
- Farming skills
- Shortage of labour and draught animals – affects moisture conservation

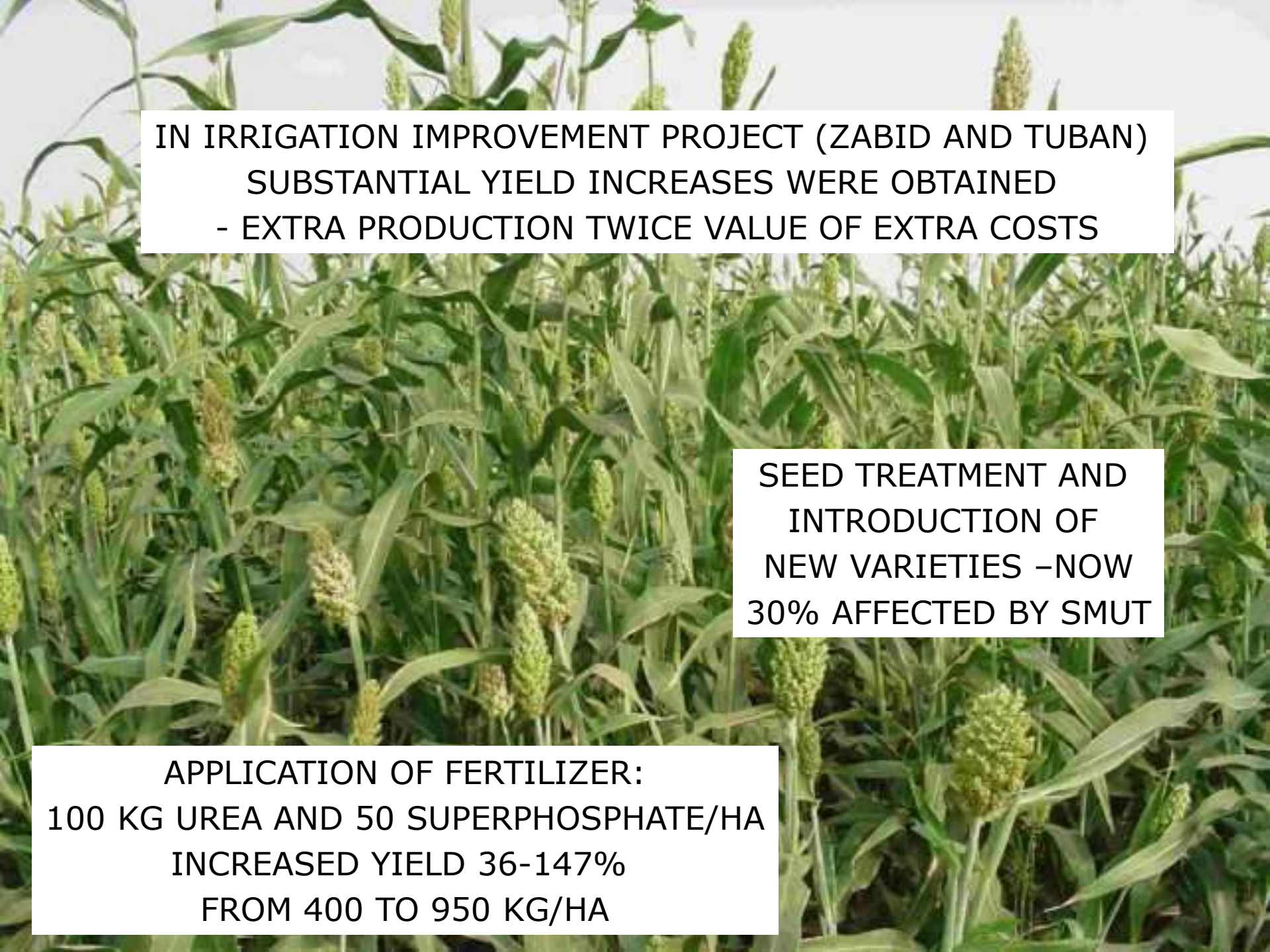


Comparing yields of crops irrigated by spate-only ..

Kg/ha	Yemen	Pakistan	Eritrea
Sorghum (grain)	400-2500	400-550	800-5000
Cotton	350-3500	360-620	200-1000
Millet	500-1000		200-900
Sesame	200-500	150-350	200-800


Considerable scope for increased crop yields in spate irrigation


SORGHUM YIELDS IN EASTERN LOWLANDS OF ERITREA REACH 5 TON/HA DUE TO PREVAILING IRRIGATION AND MOISTURE CONSERVATION STRATEGIES
ELSEWHERE SORGHUM YIELDS ARE 0.5-1.5 TON/ HA

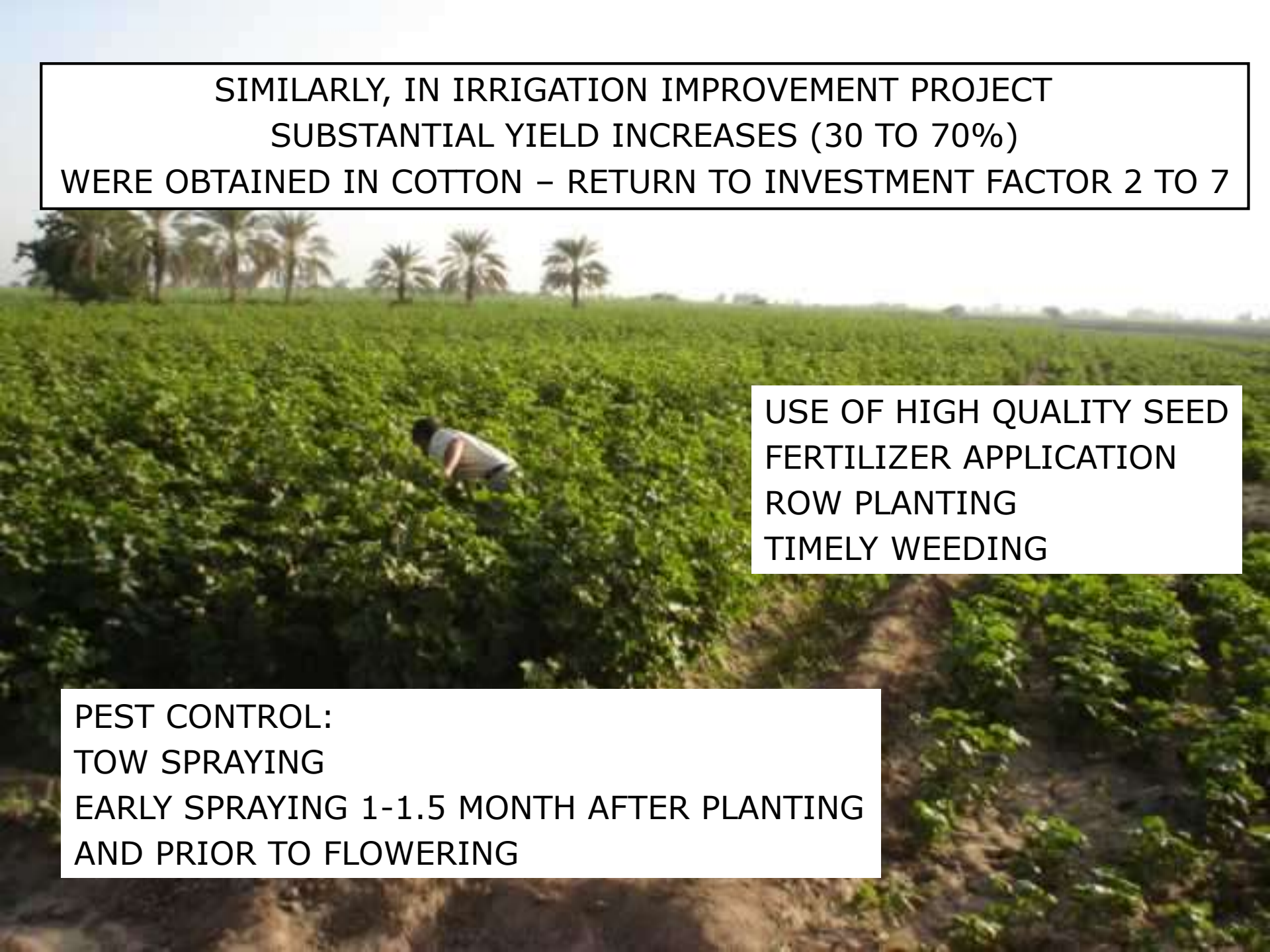


IN IRRIGATION IMPROVEMENT PROJECT (ZABID AND TUBAN)
SUBSTANTIAL YIELD INCREASES WERE OBTAINED
- EXTRA PRODUCTION TWICE VALUE OF EXTRA COSTS

SEED TREATMENT AND
INTRODUCTION OF
NEW VARIETIES –NOW
30% AFFECTED BY SMUT

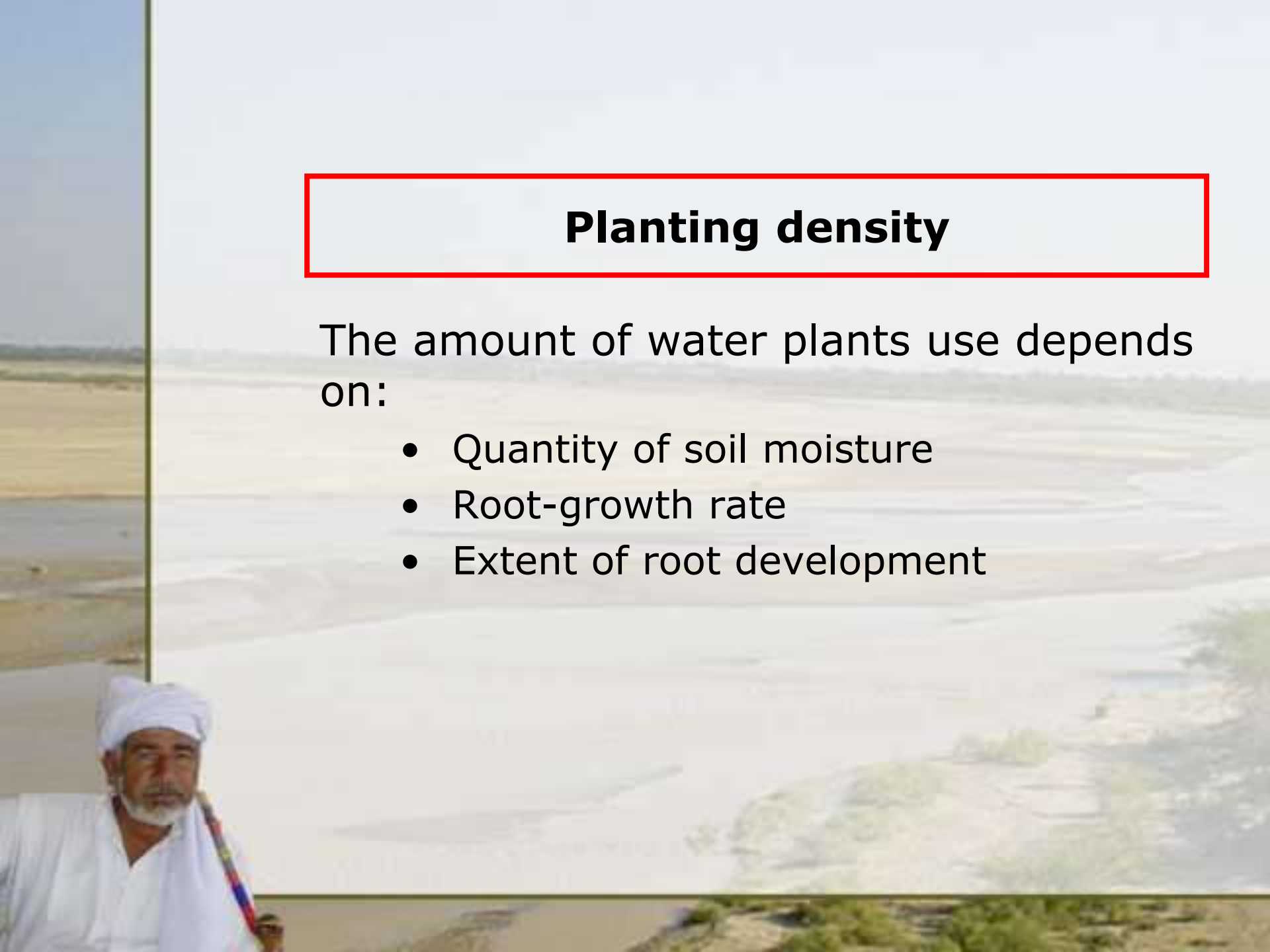
APPLICATION OF FERTILIZER:
100 KG UREA AND 50 SUPERPHOSPHATE/HA
INCREASED YIELD 36-147%
FROM 400 TO 950 KG/HA

SIMILARLY, IN IRRIGATION IMPROVEMENT PROJECT
SUBSTANTIAL YIELD INCREASES (30 TO 70%)
WERE OBTAINED IN COTTON – RETURN TO INVESTMENT FACTOR 2 TO 7



USE OF HIGH QUALITY SEED
FERTILIZER APPLICATION
ROW PLANTING
TIMELY WEEDING

PEST CONTROL:
TOW SPRAYING
EARLY SPRAYING 1-1.5 MONTH AFTER PLANTING
AND PRIOR TO FLOWERING



Planting density

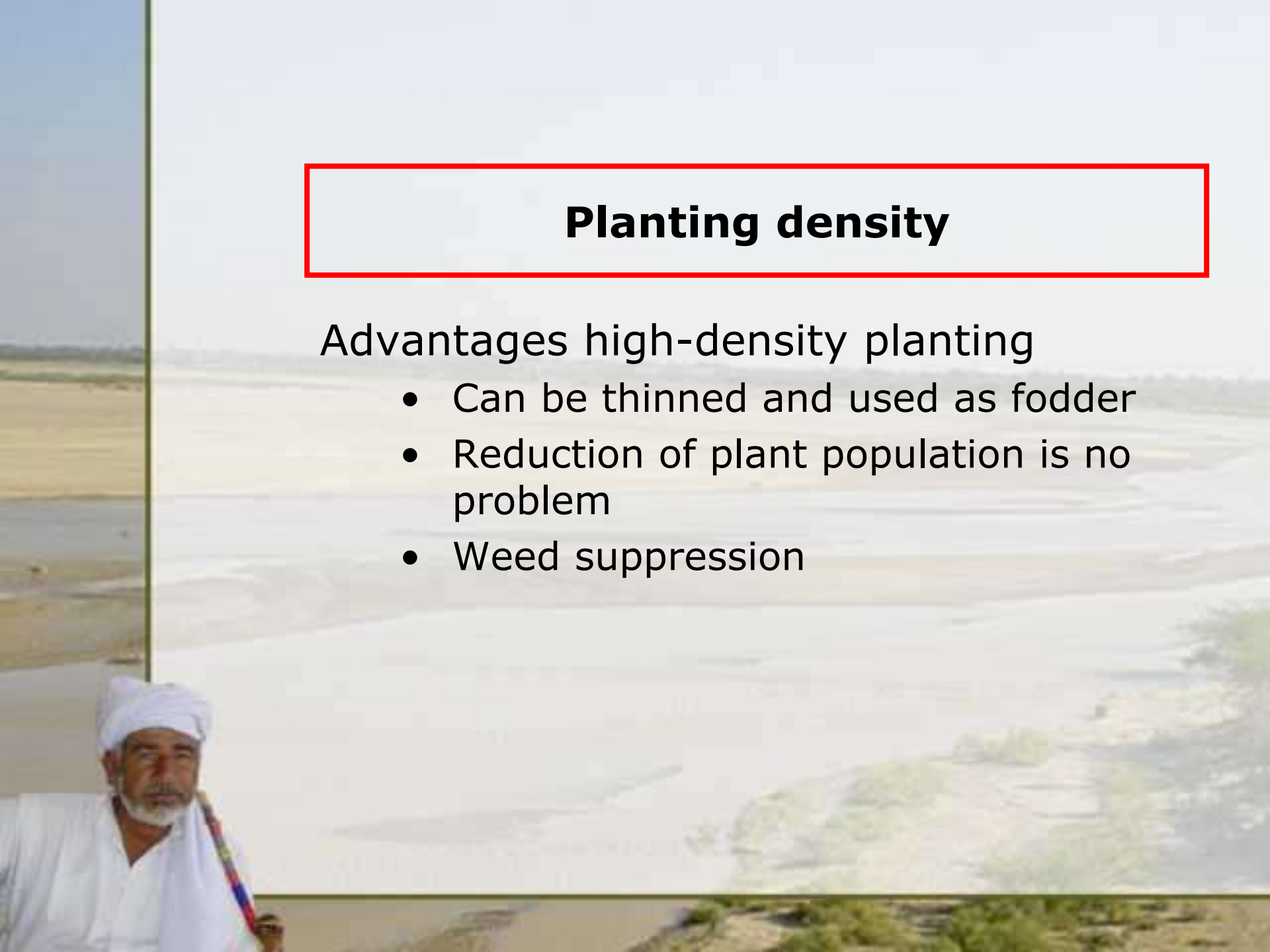
The amount of water plants use depends on:

- Quantity of soil moisture
- Root-growth rate
- Extent of root development

Planting density

Advantages high-density planting

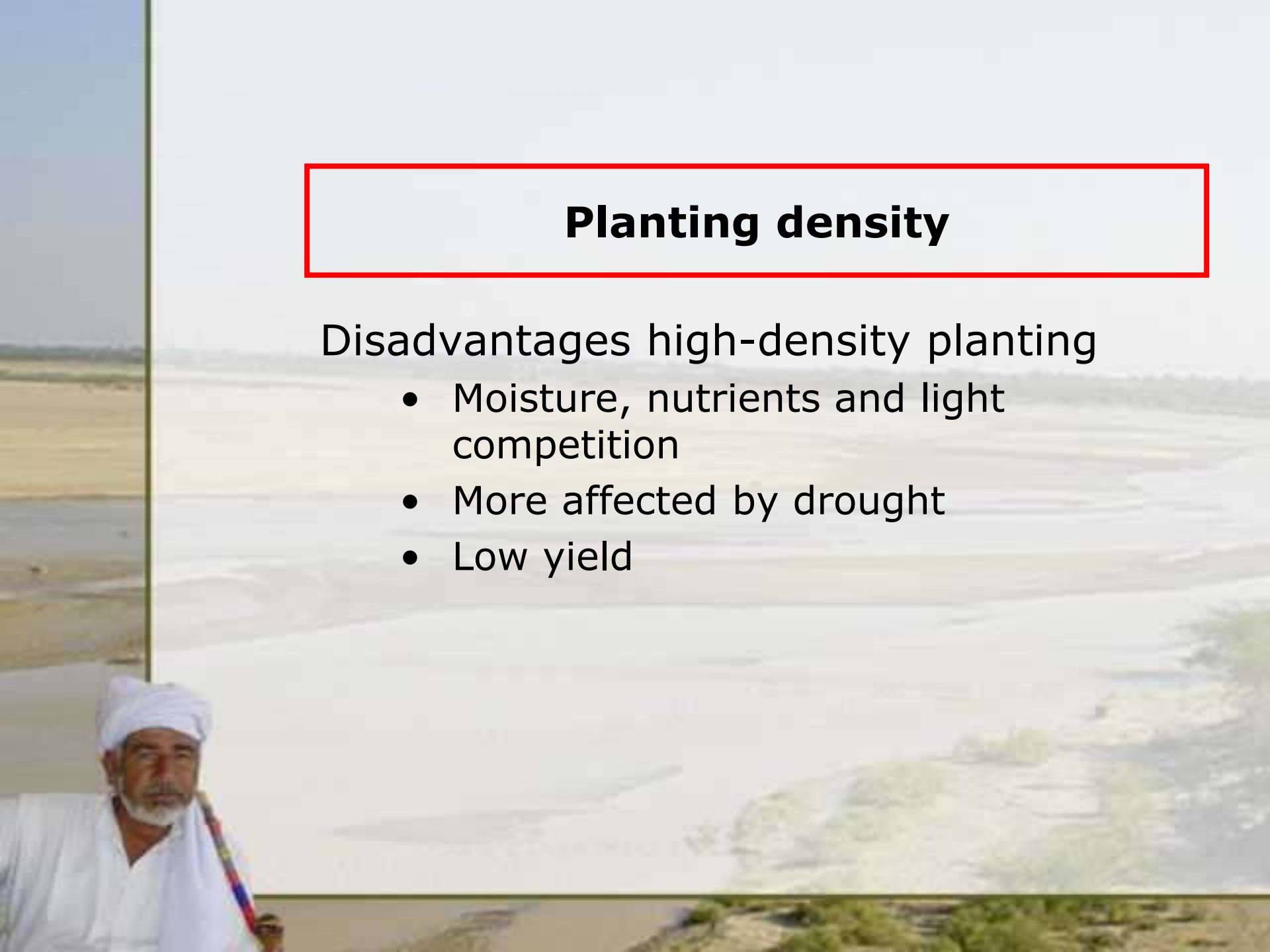
- Can be thinned and used as fodder
- Reduction of plant population is no problem
- Weed suppression



Planting density

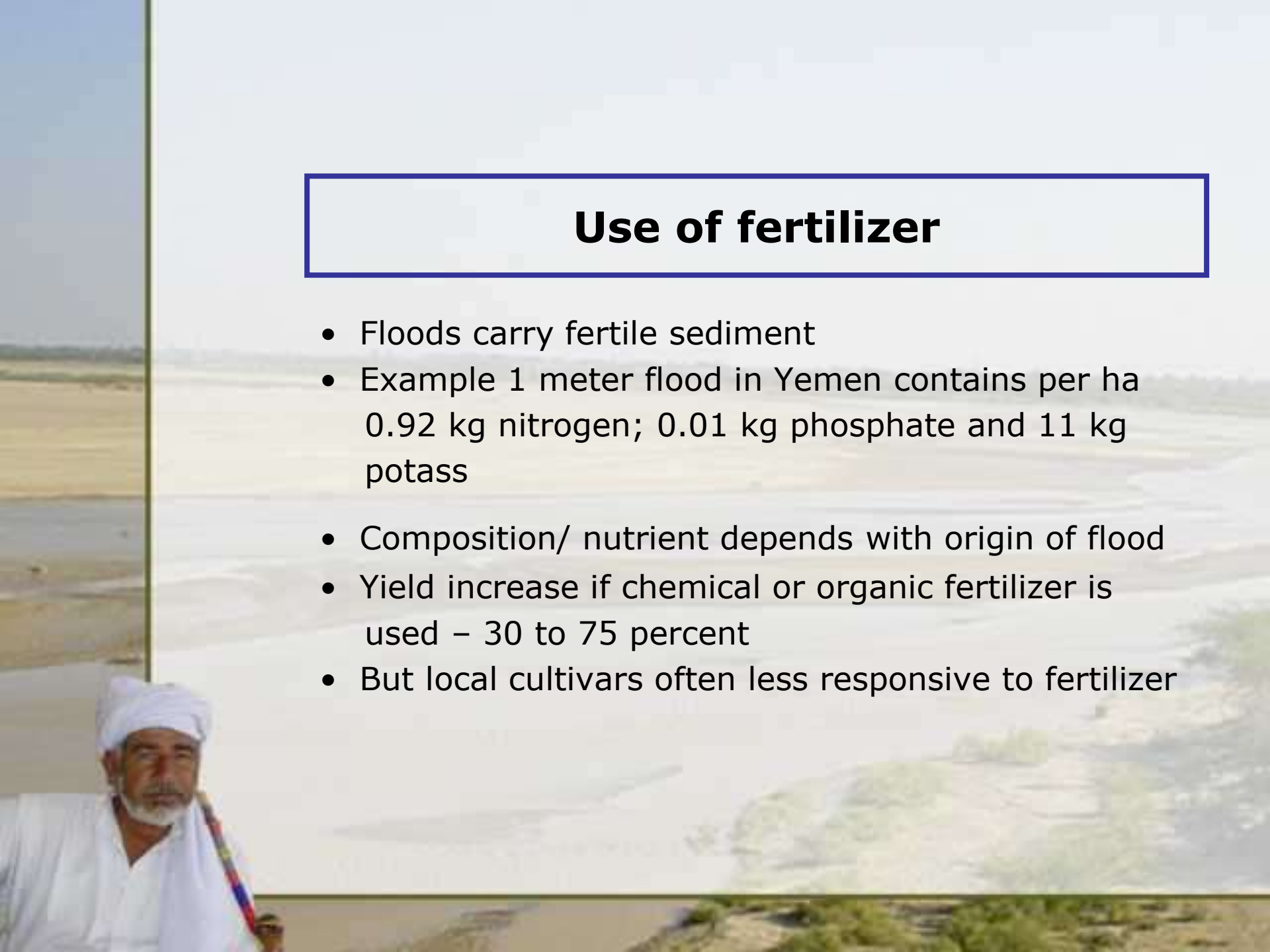
Disadvantages high-density planting

- Moisture, nutrients and light competition
- More affected by drought
- Low yield



Use of fertilizer

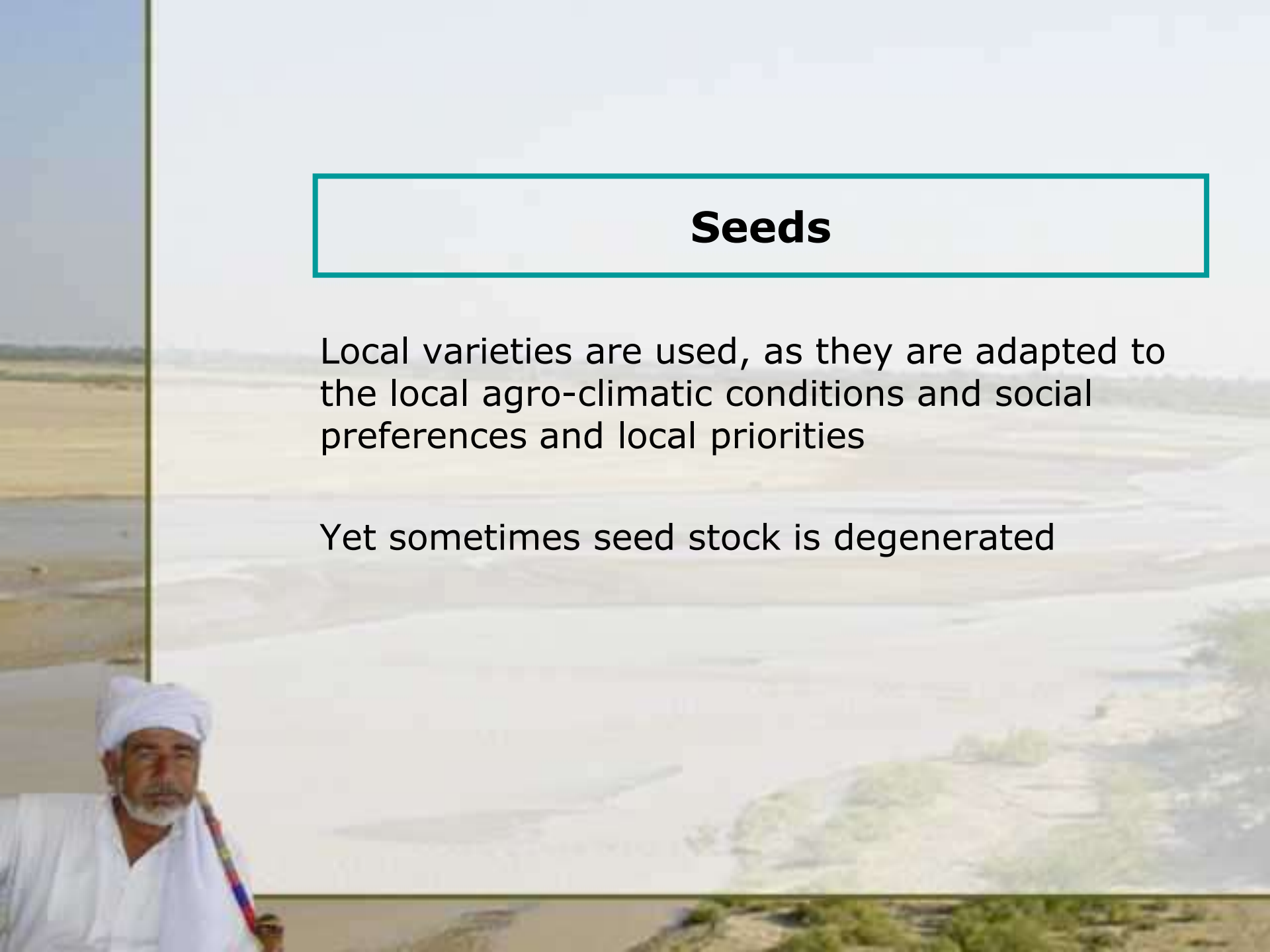
- Floods carry fertile sediment
- Example 1 meter flood in Yemen contains per ha 0.92 kg nitrogen; 0.01 kg phosphate and 11 kg potass
- Composition/ nutrient depends with origin of flood
- Yield increase if chemical or organic fertilizer is used – 30 to 75 percent
- But local cultivars often less responsive to fertilizer



Seeds

Local varieties are used, as they are adapted to the local agro-climatic conditions and social preferences and local priorities

Yet sometimes seed stock is degenerated



Example – local priorities in evaluating sorghum varieties in Sheeb, Eritrea

Germination rate
Vulnerability to pest and diseases
Vulnerability to water stress
Uniformity in emergence
Uniformity in size
Panicle size and yield
Thickness of stalk
Palatability of stalk
Colour
Ease of grinding it with stone

Pests, diseases and weed

Impact of pests and diseases can be dramatic

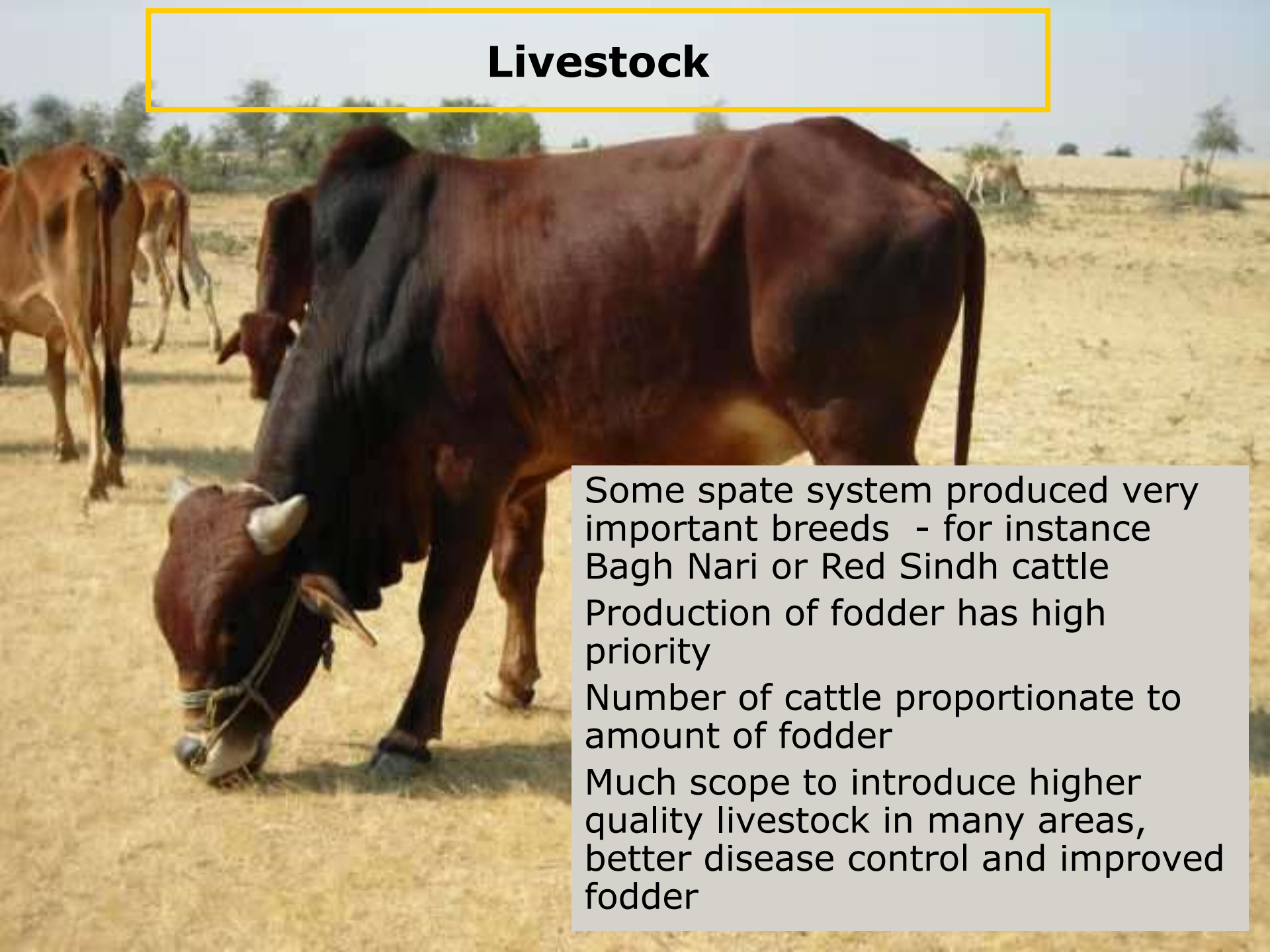
Use of pesticides and insecticides is rare, due to limited credit

Solution:

If possible, change sowing dates

Careful and timely use of pesticides

Livestock



- Some spate system produced very important breeds - for instance Bagh Nari or Red Sindh cattle
- Production of fodder has high priority
- Number of cattle proportionate to amount of fodder
- Much scope to introduce higher quality livestock in many areas, better disease control and improved fodder

Livestock

Essential role of Women

Use of livestock:

- Tilling land
- Construction and maintenance of structures and field bunds
- Transport
- “Money deposit” (buy in good year, sell in bad year)
- Experince and technology sharing

Recommendations

Spate irrigation often forgotten in agronomy development programmes

But high potential:

-Improved practices existing crops

-Promising new crops

Potential to increase production from better crop management often higher than scope for better water control

Registration and patient rights – Extar value/prices

Agricultural extension, training and research

Recommendation: Improve the quality and reach of public and private extension services in spate irrigated areas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