AER 1:

**Constraints**

• Severe climatic conditions, especially cryic temperature regime which acts as a thermal pan for plant growth.

• Narrow crop growing period limits agriculture to valleys during thawing period which coincides with the scanty rains.

• Shallow, sandy and gravelly/bouldery soils.

• Moderately to highly calcareous nature of soils which poses nutrient imbalance for normal crop production.

AER 2:

**Constraints**

• Erratic and scanty rainfall leading to high water deficit.

• Soil salinity leading to frequent physiological droughts.

• Acute droughtiness at the time of grain formation.

• Nutrient imbalance, especially for N, P Zn and Fe.

AER3:

**Constraints**

• High runoff and erosion hazard during stormy cloud bursts.

• Prolonged dry spells during crop growing period resulting in occasional crop failure.

• Narrow range of workable soil moisture in Black soils.

• Subsoil sodicity affecting soil structure, drainage and oxygen availability, especially in subdominant Black

soils.

• High subsoil density in Red loamy soils limiting effective rooting depth.

AER 4:

**Constraints**

• Coarser soil texture and low plant available water capacity (AWC).

• Over exploitation of groundwater, resulting in lowering of groundwater table in some areas

• At places, imperfect drainage conditions lead to spread of surface and subsurface soil salinity and/or

sodicity.

AER5:

**Constraints**

• The intermittent dry spell periods.

• Imperfect drainage limits optimum root ramification and oxygen availability in low-lying areas.

• Salinity and alkalinity hazards under irrigated agriculture.

• Severe salinity and seasonal inundation by sea water in the Kathiawar coast resulting in crop failure.

AER6:

**Constraints**

• Prolonged dry spells adversely affect the crop growth and lead to crop failure in some years.

• High runoff during stormy cloud bursts in the rainy season result in heavy soil loss.

• Deficiency of N, P and Zn leads to nutrient imbalance.

AER7:

**Constraints**

• High runoff during rainy season leads to severe soil and nutrient loss both in the Red and Black Soil areas.

• Under irrigated agriculture, unjudicious use of irrigation water and imperfect drainage conditions

result in high groundwater table leading to subsoil salinity and sodicity, especially in the Black soil areas.

• Deficiency of N, P and Zn in soils results in nutrient imbalance.

• Frequent droughtiness results in crop failure in some years.

AER8:

**Constraint**

High runoff that results in severe soil erosion.

• Coarse soil texture and low to medium PAWC1 , resulting in severe droughtiness during the crop growing period.

• Nutrient imbalance, resulting from deficiency of N,P and Zn.

AER9:

**Constraint**

• An injudicious use of irrigation water may lead to waterlogging and salinity hazards.

AER 10:

**Constraints**

• Cracking clayey soils having narrow workable moisture conditions.

• Dry tillage and inter-tillage practices are difficult to perform.

• Risk of inundation of the cropped areas during rainy season and risk of acute droughtiness due to prolonged dry spells in Kharif season lading to crop failure at places.

• Soil loss due to heavy runoff during rainy season resulting in stagnation of water and poor germination.

• Deficiency of N, P and Zn resulting in nutrient imbalances.

AER11:

**Constraints**

• The soils are susceptible to severe water erosion hazard.

• Partial waterlogging in early stages of crop growth and seasonal droughtiness during advance stage crop

growth.

• Subsoil gravelliness and coarse texture, at places,reduce AWC.

• Deficiency in N, P and micronutrients, such as Zn and B, causes nutrient imbalances.

AER:12

**Constraints**

• The soils are susceptible to severe erosion hazard.

• Seasonal droughtiness limits optimum crop yields.

• Subsoil graveliness and coarse soil texture results in low AWC.

• Deficiency of N, P and some micronutrients, such as Zn and B causes nutrient imbalances.

• The soils are subject to moderate to high P fixation (especially the Red and Lateritic soils).

AER:13

**Constraints**

• Flooding and imperfect drainage conditions limit soil aeration.

• Salinity and/or sodicity, occurring in patches, affect crop yields.

• Deficiency of N, P and Zn results in nutrient imbalances.

AER:14

**Constraints**

• Severe climate, especially cryic/frigid temperature regime, in northern high altitude permits limited choice of crops.

• Deforestation and excessive slopes favour soil erosion.

• Soil degradation, results in common landslides.

• Imperfect drainage conditions in valleys limits the choice of crop.

• Soil acidity, especially in Kangra and Manali areas of Himachal Pradesh

• Droughtiness is experienced especially in the lower hills due to excessive runoff and coarser soil texture.

AER:15

**Constraints**

• Flooding and waterlogging

• Excessive leaching of bases and nutrients, resulting in low base status soils, especially in the Bramhaputra

(Assam) Plain.

• Soil acidity (results in plant nutrient fixation, especially P) leads to nutrient imbalances.

AER:16

**Constraints**

• Severe climatic conditions restrict the choice of crops.

• Steeply sloping landforms encourage heavy runoff resulting in severe erosion hazards.

• Deforestation for shifting cultivation leads to severe soil degradation problem.

• High rainfall leading to intense leaching results in soils with poor base status.

• Excessive moisture leading to water stagnation in valleys during (post) monsoon period limits the

choice of crop.

• Low temperature during post-monsoon period limits the cultivation of second arable crops. Monocropping

is therefore commonly practiced in these regions.

AER:17

**Constraints**

• Deforestation and shifting cultivation result in severe soil erosion hazard.

• Excessive rainfall leading to leaching results in depletion of nutrients rendering soils poor in base

status.

• Low temperature in post-rainy period limits the introduction of a wide variety of crops.

• Small to marginal land holdings limit the introduction of modern implements.

AER:18

**Constraints**

• Imperfect to poor drainage conditions and limiting oxygen availability adversely affect crop yield.

• Soil salinity (and sodicity at places) resulting from poor drainage conditions adversely affect crop

production.

• The area is prone to cyclone during monsoon and retreating monsoon periods.

AER:19

**Constraints**

• Excessive leaching that leads to depletion of plant nutrients and bases.

• Waterlogging, resulting from imperfect drainage conditions affects crop growth in the coastal plains.

• Steep slopes, causing runoff, leads to severe soil erosion.

• Inundation of land area results in localised saline marshes.

AER:20

**Constraints**

• Degradation of the tropical rain-forest ecosystem leads to severe soil erosion hazard. With the clearing

of rain forests, the ecosystem is disturbed resulting in severe soil erosion. Simultaneously economic

interest to protect tropical rain-forest demands introduction of sustainable plantation crops (oilpalm)

by using technology, which may ensure maintaining the ecosystem. It may demand deforestation in strips

followed by plantation of oilpalm to provide protection against erosion.

• Inundation of coastal areas leads to saline marshes and consequently formation of acid sulphate soils.

• Gradual increase in areas under mangroves suggests increase in degradation of the coastal areas.