

## Radio Serial on Sustainable Development

### MANAGING LAND AND CHANGE LAND USE

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Announcer: Hi! Listeners. Good morning. Land-use activities whether converting natural landscapes for human use or changing management practices on human-dominated lands have transformed a large proportion of the planet's land surface. By denuding tropical forests, practising subsistence agriculture, intensifying farm land production or expanding urban centres, humans are changing the world's landscapes. The land-use practices may vary across the world or across our country, but their ultimate outcome is generally the same: to produce food & fibre and to acquire natural resources for immediate human needs. However, population explosion and over exploitation of limited natural resources have caused deterioration of land. We now bring to you an interesting episode on the impact of land deterioration on agriculture sector, the distress of farming community and the steps being taken by government to alleviate the problems with a vision for sustainable development.

Let us go to the vemavaram village, in a predominantly agriculture area. Kamayya a small farmer is sitting on the village rachhabanda under a peepul ( sacred fig or bodhi or ashwattha tree). Let us listen to the conversation.

Characters:

**Kamayya (51) Farmer...Father**

**Harita (46) Professor of Agriculture**

**Vasudha (47) House wife..Mother**

**Dr. Bhaskar(48) Ag. Scientist**

**Prudhvi(22) M.Sc., Zoology student...son**

**Ganga (45) Tahsildar**

**Bharati(19) B.Sc.,student.daughter**

**Dr. Hussain( 52) Soil Scientist**

**Veerayya(50)&Rajanna(34) farmers**

**Sivaji (50) Aqua culture farmer**

#### SCENE-1

Vemavaram is a major gram panchayat in a predominantly agricultural area. Most of the farmers in the village are not happy due to poor crop yields. Kamayya is a marginal farmer in the village. It was a Saturday evening. Kamayya was sitting on the village rachhabanda under a peepal tree, where some other people were chitchatting. Kamayya's friend Sivaji came there.

**Sivaji:** Hi Kamayya bhai ! It's a long time since we met. Generally, you go to a weekly sandy in the town every Saturday. But you are on this rachhabanda and look worried. Why?

**Kamayya:** Yes, Sivaji, you are my best friend . As you said I am not happy. You know I have been cultivating paddy. Previously, I used to get nearly 40 bags yield from each acre of my 5 acre land. But, over the last 2 years I got only 20 bags. I incurred loss and could not repay loans. I again invested on the rabi crop. I am worried about the yield.

**Sivaji:** I came here to visit my sister. My brother-in-law is also saying the same problem. What has gone wrong here, kamayya?

**Kamayya:** I don't know why it is happening like this. I used more fertiliser and pesticide than before.

**Sivaji:** I think the seeds are not good.

**Kamayya:** No,Sivaji. I tried with the best quality seeds but each season the yield is much worse.

**Sivaji:** Then the problem must be with the soil. Your friends are also facing the same problem.

You all sit together and seek the advice of agricultural scientists.

**Kaayya:** It is a good suggestion. By the way, what about you? You are also having farmland in your village. I think you have no problem.

**Sivaji:** I too had the same experience; Kamayya .I converted my agriculture land into shrimp pond.

I am getting good returns. Why don't you also do like that?

**Kamayya:** I can't take any risk. I believe that prawn culture is not sustainable in the long run.

I can't give up agriculture. I will take the advice of experts for my problem.

**Sivaji:** OK Kamayya.It is becoming dark. I must go back to my village before it becomes too late. Bye

**Kamayya:** It is getting dark. I shall go home. Good night Sivaji.

(Scene Change music)

SCENE-2.

**Kamayya:** Vasudha, Oh, Vasudha, what are you doing?

**Vasudha:** Don't speak so loud. I am in the kitchen. Bringing coffee for all of you. Just wait

**Kamayya:** Today is Sunday. It is already 8 o'clock . Where are Prithvi and Bharati? Have they got up from beds or not?

**Vasudha:** Both have got up one hour back. Only you are late. Prithvi is reading news paper. Bharat is in the backyard arranging fodder for our buffalos. She is helping me whenever there is a holiday.

I shall call them here for coffee.

**Vasudha:** By the way, Sankranti festival is fast approaching. Our children are asking for new clothes.

**Kamayya:** I know that Vasudha. But you know our problems. We are already in debts. There is no hope of getting good harvest even this time.

**Prithvi:** Father, I have to pay college fees in 2 days.

**Bharati:** Father, rearing the buffalos is becoming a problem. Fodder is not enough. We may not get any income to support our family

**Kamayya:** These are all problems. I will try for a loan again. You know, my friend Sivaji told me that he converted his farm land into shrimp pond and getting profits.

**Vasudha:** I think it is not good for the future. We have to think twice before taking such decisions.

**Bharati:** Mother is right. We shall take the advice of experts.

**Kamayya:** Bharati, you are studying agriculture science. Are you learning any new things about land use.

**Bharati:** Yes father. Our college is very good. Our professors are giving us practical knowledge on several aspects of agriculture and land use. Tomorrow we are having a study visit to Mukkamala village to see organic farming and learn new things about land management .Our professor Harita is coming with us. She will explain several things. Some farmers are also coming.

**Kamayya:** Very good Bharati. I don't know about organic farming. Times are changing and we must learn new things. I will also come. I will come by my cycle.

**Vasudha:** I am listening to radio talks on such topics. Very informative.

Scene ends.

SCENE-3

Sounds of a bus arriving.

Monday morning 10'o clock. Mukkamala village. Agriculture college students arrive by bus along with professor Harita. Sarpanch Balaram and Surya, progressive farmer receive them. All go to Surya's farm.

**Harita:** Get down carefully. Bring your lunch boxes with you. Good morning everybody.

**Sarpanch :** Good morning Prof Harita. Good morning students. I am Balaram, sarpanch . Very glad that you all have come to our village for a study visit.

**Surya:** Good morning everybody., I am surya farmer. I am trying organic farming. It is a success. The yields are good I will show you the varieties when we go round the farm.

**Harita:** I think it is better to have a discussion about land use before visiting the new organic the farm developed by Surya ji. Is it ok?

**Students& farmers:** Yes, madam. Please tell. We will learn new things.

**Harita:** As you know land is a scarce resource. Its supply is fixed for all practical purposes. The available land is classified into two parts on the basis of its use. Students, will anybody tell me what they are?

**Bharati:** I shall tell madam. Agricultural land and non-agricultural land.

**Harita:** You are right Bharati. Agricultural land denotes the land suitable for agricultural production both crops and livestock. Non-agricultural land includes land under forests and permanent pastures, land under other non-agricultural uses such as towns, villages, roads, railways etc.

Can anybody tell me any other such uses?

**Kamayya:** Barren lands and lands of mountain and desert areas. Am I right madam?

**Harita:** You are right Kamayya Ji. In our country more than 50% of the total geographic area is agricultural land. Of late land use practices have changed. The modern practices are no doubt increasing the supply of material goods but they may undermine many ecosystem services in the long run.

**Kamayya:** Then how to manage the land, madam?

**Harita:** Good question, Kamayya ji. For sustainable land management, we have to integrate land, water, biodiversity and environmental management. This is necessary to meet the rising food and fibre demands while sustaining ecosystem services and livelihoods. Farmers should learn about new practices.

**Bharati:** Madam, you promised to tell us about organic farming.

**Harita:** Yes. We came here to visit the farm lands of Surya Ji. He is a role model for organic farming. We shall go round the farm and see the varieties of vegetables and fruits besides paddy. It is 1 pm now.

You finish your lunch now.

**Sarpanch:** You please sit here and take lunch. : Drinking water is available here .Don't worry.

(Students and others take lunch Appropriate sounds.)

**Harita:** Surya ji, we all finished lunch. Let us visit the farm.

**Surya:** All please follow me. Move slowly and observe every thing. This is paddy field. I raised swarna masoori. It is ready for harvest. Look there. It is banana . orchard.. Come this way. These are brinjals. These are tomatoes

**Kamayya:** Oh, very good! Papaya here, are these also organic products, Surya ji?

**Surya:** Here every crop and plantation are grown under organic farming, kamayya ji.

**Bharati:** Are you growing any leafy vegetables uncle?

**Surya:** Yes, Bharati. I allotted only a small area for hemp and garden-curry. I will try others also next season.

**Students and farmers :** Everything is fine madam.

**Kamayya:** Madam, Please tell us how organic farming is different from our agriculture practices.

**Harita:** It is a method of crop production using techniques for good crop yields without harming the natural environment or the people who live and work in it. Pesticides, fertilisers ,genetically modified organisms, antibiotics and hormones are not used.

**Kamayya:** Madam, how can we get good harvest without fertilisers ?

**Harita:** No problem, Kamayya ji. The soil is kept alive and in good health by use of organic wastes such as crop, animal and other biological wastes. Bio fertilisers, I mean beneficial microbes, are also used. All these release nutrients to the crops. You should also understand that chemical fertilisers are like antibiotics .They give temporary benefit but damage soil fertility in the long run. Organic manures are like white blood cells. They block diseases to crops.

**Bharati:** It's good madam. But, how are pests controlled without pesticides, madam?

**Harita:** Good question Bharati. Our farmers are using pesticides indiscriminately and often unnecessarily. The use of these pesticides is beneficial only to the some

promoters only but harms all others and causes irreparable damage to the environment .In organic farming pests, diseases and weeds are controlled by using resistant crops, good cultivation practice, crop rotation, encouraging useful predators that eat pests, increasing genetic diversity and using natural pesticides.

**Kamayya:** Madam, what are the benefits of organic farming?

**Harita:** Thank you for your interest Kamayya ji. There are several benefits.

Organic farming enhances the nutrients of the soil which are passed onto plants and animals. As no poisonous chemicals , pesticides and weedicides are used , diseases and sickness due to them are reduced. Organic foods often taste better than other &foods and that's why consumers prefer them.

**Bharati:** What about costs, madam?

**Harita:** Surya ji will tell you because he has personal experience.

**Surya:** Thank you madam. I will tell . I used only bio fertilisers and adopted biological control of pests and diseases under integrated pest management. So the costs are very much reduced and the crops also have high demand.

**Harta:** It is already 5pm. We shall take leave.

**Surya:** Just wait, madam. I asked my watchman to collect some fruits from my farm. See, he is coming. These are all for you .Taste the bananas and papaya slices. Tell me how you feel .

**Harita and students:** Oh! Excellent. The taste was never so good. Thank you very much Surya ji. Bye

(Sounds of Bus moving. Scene ends)

#### SCENE-4

**Kamayya:** vasudha, I took loan from Sivaji. I brought some grossary items. It is 5 pm. Have our children returned from college?

**Vasudha :** They have just returned. I will arrange tea for all. You all can sit together and discuss any matter. I will also join you.

**Prithvi :** Father, in today's news paper I read a news item that a seven-member herd of wild elephants strayed into Shantipuram mandal of AP from the thickets of Bangarpet range of Karnataka. The herd was driven back into their habitat by the forest officials and farmers. They fired crackers to scare the tuskers. Four persons were severely injured in a stampede when the herd charged at the crowds.

- Vasudha:** Recently I heard in radio news that three wild elephants were killed after a speedy passenger train ran over them in Assam's Hojai district.
- Bharati:** I too read a news paper report that recently a big cat and its cubs strayed near human habitations on the foothills of Aravilli mountains near Gurugram city.. The incident came days after the residents of a neighbouring village hacked a 3year-old leopard to death.
- Kamayya:** Such man-wildlife conflict is escalating as both often compete for the same natural resources. Leopards stray into human habitations as their natural prey is becoming rare in the forests.
- Vasudha:** The elephants are intruding into the villages and marauding the crops . Wild animals are losing their lives when they come into contact with electrical barbed wire fencing of coffee estates etc.
- Kamayya:** These wild animals are supposed to be in the forests. But, we are cutting the forests indiscriminately. We have honey combed their habitat by our developmental activities eating into their homelands and this practice is increasing day by day with the bulging population.
- Prithvi:** Yes forests are being cut for constructing roads, dams, canals, railways etc.
- Bharati:** I read that 30% of land area should be covered by forests for maintaining ecological balance.
- Kamayya:** It is true Bharati. Because of deforestation ecological balance is being disturbed and causing man-animal conflict.
- Prithvi:** Our zoology professor was telling that many varieties of animals are becoming extinct. We don't see sparrows in our area.
- Bharati:** Why only animals, several species of plants and other organisms are also becoming extinct.
- Kamayya:** Yes. Biodiversity is fast declining.
- Vasudha:** Recently I heard a radio talk on biodiversity. It was very interesting. The talker mentioned the role of biodiversity in natural processes.
- Kamayya:** You are making good use of your leisure time at home. Tell us what you heard about the role.
- Vasudha:** Different varieties of plants, animals and other organisms are involved in natural processes such as purification of water and air, pollination, absorption of carbon by trees and plants, renewed oxygen supply, natural pest control, flood and erosion control and absorption and detoxification of human and industrial wastes.

**Kamayya:** Very good information Vasudha.

**Prithvii:** I shall add one more point. Biodiversity also provides us with food, fibre, timber, energy, pharmaceuticals, raw materials and industrial chemicals. Our professor said that more than 70% of the world's poor lived in rural areas and were directly dependent on the ecosystem or biodiversity services for their survival.

**Kamayya:** It is true Prudhvi. so, it is very important to stimulate public consciousness about the role of biodiversity in sustaining life on earth , supporting ecosystem services and human well being.

**Bharati:** Is it not the responsibility of the government?

**Prithvi:** I read in our books that the Government of India has taken up National Afforestation Programme with the objective of sustainable development and management of forest resources besides increasing and improving forest and tree cover.

**Bharati:** What about wildlife?

**Prithvi:** Wild life Protection Act 1972 is there. More over the government has established 18 biosphere reserves in the country to protect larger areas of natural habitat. The Wild life Protection Society of India, a voluntary organisation is dealing with man-wild life conflict.

**Kamayya:** So, it is clear that the Government is doing its best. However, biodiversity conservation cannot be enforced by laws alone. It should come from within.

**Vasudha:** Don't you hear the mike announcement outside?

**Kamayya:** Bharati, you go and find out what it is about>

**Bharati:** It is for all farmers. Tomorrow there is a Rythu Sadassu ( Farmers meet) at the Taluk office. Scientists will answer queries about land management and change of land use.

**Kamayya:** Oh! It is very useful I must attend. I will raise problems with our land.

**Bharati:** Mom, it is already 8 o'clock. I am hungry. Let us have dinner.

**Vasudha:** Ok. I will arrange it in 15 minutes. You follow me, Bharati

( Music ) Scene ends.

#### SCENE-5

**Kamayya:** Hi, Sivaji, Hi Verayya. Already several of our friends have arrived. See the cars near the Taluk office. I think the Tahsildar and the scientists have arrived.

**Announcement:** All the farmers are requested to visit the stalls set up by the departments of agriculture, minor & major irrigation and forest departments. Photographs and posters of land-use pattern in India, water conservation, forest life, shrimp ponds, mangrove forests, organisms of top soil etc., were on display. Please see them. Meeting will commence in half an hour.

(Farmers visiting the stalls and reading out the captions of posters. Appropriate sounds)

**Announcement:** The meeting will start in 5 minutes. All the farmers are requested to come into the conference hall and be seated.

Meeting Commences.

**Ganga(Tahsildar):** Good morning friends. I am Tahsildar Ganga. Most of you are cultivating paddy and facing some problems. We have invited Dr Bhaskar, Agriculture scientist; Dr Hussain, soil scientist; and Prof Harika of Agriculture college. They will give you suggestions for better harvests and clarify your doubts. There will be good discussion on several agricultural issues and you all will get benefited.

**Dr Hussain.Good morning everybody. :** I am Dr Hussain. First tell me whether you have seen the posters and photographs in the exhibition stalls.

**Kamayya:** Yes sir. We have seen. All are very informative.

**Dr Hussain:** Which of those posters do you like?

**Kamayya:** Posters on land-use pattern in India, water conservation, forest life, top soil organisms, classification of lands and ground water protection are interesting.

**Sivaji:** I have seen many posters. I like the posters on aqua culture, mangrove forests and sustainable development.

**Dr Hussain:** Very good. We shall first know about land resources.

Land resources are used for a variety of purposes which include, inter alia, organic agriculture, reforestation, water resource management and ecotourism forests. Land degradation is a matter of concern for us.

**Kamayya:** What is land degradation, sir?

**Dr Hussain:** Kamayya ji, land degradation is a temporary or permanent lowering of the productive capacity of land. It involves loss of fertility of soil due to loss of nutrients, less vegetation cover, changes in soil characteristics, pollution of water resources from the contamination of soil through which water sweeps into ground or runoff to the water bodies and changes in climatic conditions. It thus covers the various forms of soil degradation, adverse human impacts on

water resources, deforestation and lowering of the productive capacity of rangelands.

**Kamayya:** What are the causes of land degradation, sir?

**Dr Hussain:** There are many causes. Deforestation, overgrazing, Agricultural practices, industrialisation and urbanisation.  
Sivaji: Sir, please give some details.

**Dr Hussain:** Deforestation is taking place at a faster rate due to increasing demands for timber, fuel and forest products. Overgrazing is the excessive eating of grasses and other green plants by cattle.

It results into reduced growth of vegetation, growth of unwanted plant species and soil erosion. Modern agricultural practices, excessive use of fertilisers & pesticides have adversely affected the quality and fertility of land. Industrialisation and urbanisation due to growth of population and demand for more residential areas and commercial sectors are also causing land degradation.

**Kamayya:** What are the measures for prevention and control of land degradation, sir?

**Dr Bhaskar:** Ok. I am Dr Bharat. I shall answer your question, kamayyaji.. There are some measures like strip farming, contour farming, ridge and furrow formation, crop rotation etc.

**Kamayya:** Sir, very often we are experiencing drought conditions due to failure of monsoon. Please tell us about water conservation.

**Dr Bhaskar:** Sure. As you all know water is very important resource. Water conservation means using less water or recycling used water for reuse. You all should know about some measures for water conservation to cope with drought conditions very often.

**Kamayya:** Yes sir. We are adopting rain water harvesting. The village tanks are also renovated by the government recently. We all participated voluntarily.

**Dr Bhaskar:** That's good. You should also know about drip irrigation, sprinklers & rain guns for dry land farming, rotational grazing, drought-resistant crops, cover crops etc. You can find details in the posters in the exhibition stalls.

**Kamayya:** Ok sir.

**Ganga:** Sir, increasing salinity of ground water is another problem in our area

**Dr Bhaskar:** Madam, this is an important issue for agriculture. Increasing salinity of ground water and soil leads to reduced agricultural production and reduced farm income.

**Kamayya:** Sir, what causes ground water salinity?

**Dr Bhaskar:** It is mainly because of over exploitation of ground water for agriculture, industry and domestic sectors; and incursion of seawater. Conversion of farm lands into shrimp ponds is also responsible. Prof Harita: You know, sir, mangrove forests in our district are also being destroyed.

**Dr Bhaskar:** It is very bad that mangroves are undergoing depletion. People should understand the importance of mangrove forests.

Mangroves are buffers between the land and the sea. They prevent erosion of coastline due to storms and sea waves. These forests are home to a variety of fish, crab, shrimp and mollusc species. There are several medicinal plants also. Several plant species in these forests do not re sprout after being cut.

**Harita:** We should bring about awareness among the people about mangroves. We will arrange a study visit to mangrove forest in our district. Some farmers also can join.

**Ganga:** We have so far discussed some issues concerning land use. We know that most of the farmers are facing some problems in agriculture. Our scientists will answer if you have any questions. Kamayya: Thank you madam. I have 5 acres of land and cultivating paddy. I am using best quality seeds and even more fertiliser and pesticide than before. But my land is not giving as much yield as before. I am incurring losses and running into debts. Many of my fellow kisans are also facing similar problem in our village.

**Dr Hussai:** Oh, I understand your problem Kamayya ji. Your land has lost its fertility.

**Kamayya:** What is the reason, sir?

**Hussain:** Farmers should know that the health of the soil depends upon the health of the top soil. Top soil contains all the natural nutrients, mainly organic matter that plants need. The texture and animal life of this layer is also important for plant growth. The top soil should be alive. If it dies, the soil dies.

**Sivaji:** Sir, do you say that Kamayya's soil is dead?

**Hussain:** No, Sivaji bhai. The soil is not dead. It is probably dying.

**Kamayya:** Oh, what happened to the top soil in my land, sir

**Hussan:** It might have been washed off or eroded away.

**Kamayya:** What is the reason, sir?

**Hussain:** One reason is splash erosion. When rain falls directly on the soil, the rain drops break the soil, loosening it into fine particles. These particles in top soil of the field are carried away by the rain water. Thus the top soil with all its rich organic matter and life farms gets washed off.

**Kamayya:** Sir, please tell us how to stop splash erosion.  
**Hussain:** The problem is you are all following bad agricultural practices and seeking advice from dealers. Inefficient ploughing, over harvesting etc., are some such bad practices. After a crop you should leave the stubble in the field. Then untimely rains and wind don't destroy much. Farmers should take care if the land is sloping,

**Sivaji:** Sloping is more a problem in hill areas.

**Hussain:** Yes. If the slope of the land is steep, more soil is washed off easily when the rains are heavy.

**Svaji:** What are the ways to stop soil loss in such areas, sir?

**Hussain:** The farmers should take some measures where the land is sloping.

Making bunds across the slopes is one important measure. The bunds break the force of the rain water flowing down. This will check the soil from being washed off. Another measure is to build check dams on the small streams between fields.

**Sivaji:** Sir, the bunds may also be washed away by the force of water.

**Hussain:** It is possible. Planting trees or plants on the bunds will prevent the bunds being washed away. The bunds will also trap organic matter, seeds etc., as well as soil and water.

**Kamayya:** Sir, you said that the soil in my field has lost its fertility. Please suggest some measures to improve fertility.

**Hussain:** In some aspects the measures adopted by our ancestors are good. We should recollect them and practise them to prevent soil loss from our farm lands. Prof. Harita will tell you.

**Harita:** Our ancestors knew a number of ways to check top soil from running off. Mixed cropping is one such measure. Crop mixes such as wheat+mustard, Arhar+ Ground nut, maize+ cowpea etc., were grown.  
**Kamayya:** How is this measure helpful, madam?

**Harita:** In mixed cropping, after a harvest of one crop there is another growing up or covering the soil so that the soil is never bare or exposed. There is another advantage also. Suppose, one crop fails, the farmer is assured of the other crop. He is on the safe side. Planting used to be done along the contours as a

soil conservation measure. Leguminous plants sun hemp, cowpea and cereal crops were grown in a particular fashion to check soil erosion.

**Hussain:** Prof Harita told you some measures. There is another measure to keep soil erosion in check.

That is adding organic matter. Some farmers used to grow crops like sun hemp or pigeon pea. When they are well grown they let the water in or after the first rain drive the plough over thus mixing all the organic matter into the soil. Others added compost, such a vermi compost to the field.

**Kamayya:** Good information. I will try.

**Ganga:** Ok, friends. Now, we have tea break. We shall reassemble here after 15 minutes and continue the discussion.

**Farmers:** Ok., madam.

(Sounds of tea cups. Farmers chit chatting about their problems).

The meeting continues after the break.

**Veerayya:** Hussain sir, I have another problem.

**Hussain:** What is that problem Veerayya Ji?

**Veerayya:** Sir, The land in which I did agriculture before became barren except for a few patches where bushes have grown. The face of the soil has become white.

**Hussain:** Turned white! That means, your soils might have been affected by salinity or alkalinity.

**Veerayya:** Sir, what is the remedy?

**Hussain:** There are two ways to reclaim the land. Most important thing is to ensure proper drainage. Another measure is to reduce evaporation from the soil surface thereby reducing the amount of salt coming up. To achieve this you have to keep the soil covered up. Other options are adding gypsum or ferrous sulphate. The Ph of alkaline soils can be lowered by regularly applying compost and manure.

**Sivaji:** Sir, previously, I cultivated paddy in my field. I faced many problems such as non-availability of man power. I incurred loss. That's why I converted my farm into a shrimp pond and ventured shrimp culture. I am getting profits.

**Ganga:** Several farmers are doing like that in our villages. Dr Bhaskar will respond to this.

**Dr Bhaskar:** This is not a local issue. It is observed at several other areas also. Agricultural lands in coastal areas are being converted into prawn tanks. In some villages

coconut fields are also being converted into hatcheries and shrimp ponds. Mangroves are being cut for shrimp culture. You may get profits now but it is only temporary because prawn culture is not sustainable in the long run when compared to agriculture.

**Ganga:** Our farmers are unmindful of the environmental impacts of prawn culture. Bhaskar ji please say a few words about it.

**Dr Bhaskar:** Ok Madam Tahsildar. Aqua farmers are using a number of chemicals raising environmental concerns. The runoff from the aqua farms is rich in nutrients. It is generally let out into the surrounding water ways causing eutrophication which means plant and algal bloom. It leads to depletion of dissolved oxygen resulting in the killing of marine species. The waste from the shrimp farm when applied to land causes soil acidification.

**Ganga:** In some places fresh water from ground water is pumped to mix with sea water to adjust salinity level.

**Dr Bhaskar:** This ultimately leads to salt water intrusion into ground water and land subsidence.

**Kamayya:** Sir, aqua farmers use antibiotics and other drugs to control or prevent disease outbreaks.

**Dr Bhaskar:** Yes. This is a matter of concern. All these eventually end up into the environment leading to antibiotic-resistant pathogens and some other problems.

**Harita:** Ok, friends. So far we have discussed several issues concerning land management and change of land use. There are several common problems. Farmers should understand that agriculture is a collective activity. You cannot solve your problems unless you sit together and share information. If each farmer deals with dealers or agencies separately, he/she will be easily misled as they are always interested in their profits only.

**Dr Hussain:** We all must understand that in the modern times human activities are transforming the landscape. The land use change is a driver of climate change. Tropical deforestation is a major contributor to CO<sub>2</sub> increase in the atmosphere. Conversion to agriculture or pastureland is the primary driver to tropical deforestation. There is a change in the energy and water balance at land surface.

**Dr Bhaskar:** Urbanisation is a major land use change .It concentrates energy consumption and hence waste heat consumption. It also removes vegetation.

**Kamayya:** It is true, sir. But population is increasing. We have to ensure food security for all. Then what is the way out?

**Dr Bhaskar:** Good question. You know, fortunately in the last four decades, there have been several scientific advances and the application of improved knowledge and technologies have resulted in significant total and per capita food increases. They have reduced food prices and paved the way for sparing of new land that otherwise would have been needed to achieve the same level of production. Of course, It may be necessary to launch a second green revolution without detriment to environment.

**Harita:** Finally, I would like to tell all our farmers that in the 21<sup>st</sup> century, food and fibre production systems will need to reduce the degradation of natural resources and the ecosystem services essential to sustaining healthy societies and land productivity.

**Dr.Hussain:** It is a good suggestion, madam professor.

Friends, it is also necessary to understand that biodiversity which is a unique and critical asset is under pressure due to anthropogenic reasons. Biodiversity once lost is lost forever. It is necessary to integrate actions concerning conservation and sustainable use of biodiversity with strategies related to production sectors such as agriculture, fisheries, forestry, tourism and mining. *Biodiversity integration into developmental plans is necessary for sustainable development. The government is taking several steps in that direction.*

*Shouts of ‘ All hear me, I will commit suicide’.*

*(There is commotion in the conference hall. The scene changed suddenly*

*.Appropriate sounds)*

**Harita:** What is that? Why are you shouting?

**Veerayya:** Madam, he is a farmer Mr Rajanna from our neighbouring village.

**Ganga:** Mr. Rajanna. You are a young farmer. Don't get emotional. Tell us. What is your problem? We are here to help you.

**Rajanna:** Madam, I purchased cotton seeds and invested huge amount on the crop. But the crop is a total failure. I can't repay my loans. I have no other way except to commit suicide.

**Ganga:** Don't take hasty decisions .Government is implementing several schemes to help poor farmers . Some agricultural loans are being waived. You will get fresh loans. Don't worry.

**Rajanna:** Madam, the dealer deceived me. He sold spurious seeds.

**Ganga:** We will punish the fake dealer. You purchase certified seeds for all crops from National Seed Corporation or State Seed Corporation outlets.

**Rajanna:** Thank you madam. I will follow your advice

**Ganga:** Ok friends. I think the meeting is useful to all of you. We have arranged working lunch for all of you in the dining hall. Please take the lunch before leaving. We have placed some pamphlets on sustainable land use. Please take them and discuss with your friends.

**Kamayya , Sivaji and all other farmers:** Thank you madam. We learnt several useful things and understood the importance of sustainable development.. We are thankful to Prof Harita, Dr Bhaskar and Dr Hussain for giving valuable information and suggestions.

Scene Ends. Closing Music

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Dr E.R.Subrahmanyam, Principal ( Retd ), SKBR PG College, AMALAPURAM, E.G.Dt., AP

District Hon'y President, Janavignana Vedika ,