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Sustainable Village Project
Student Instruction Sheet

Welcome, environmental planners! Your next work assignment is to travel to a remote village in Ethiopia which needs help with some major human health and environmental problems:

- Desertification of croplands and pasturelands
- Undrinkable water (raw human waste is being dumped directly into the river and pond from homes near the riverbank)
- Undrinkable water (pesticide contamination from croplands)
- Undrinkable water (fertilizer contamination from croplands)
- The villagers have no source of food:
 - *The native wildlife that uses the river have all died (birds, fish, antelope)
 - *The soil is too unhealthy to produce crops
 - *The pasturelands cannot support livestock
- Villagers are becoming sick due to poor nutrition and contaminated water
- Villager homes are flooded and destroyed each year with seasonal monsoons

Take a look at the map of the village, which is divided into one-acre boxes. Overgrazing by pasture animals has compacted the soils and the village has over-farmed the area to a desertification state. The soil has lost all of its nutrients and organic matter. The water supply is contaminated with sediment from land erosion and chemicals (runoff from pesticides and fertilizers used for growing crops), animal and human waste has polluted the water and almost all of the livestock have died. Local wildlife and game have died or moved on and the villagers are dying. The remaining livestock animals have been moved into barns on hills above the river and pond. Waste from the animals is flowing into the river and pond. Could there be another use for the herbivorous animals' waste? People are getting sick from drinking water that is contaminated with raw sewage. Farmers have become sick from applying pesticides to crops. Emergency funding for food is running low, so it is up to you to help plan a long-term healthy future for this village.

The village needs to be able to sustain itself and the surrounding environment for a long-term independent future. There may not always be funding from groups to help them out. Your job is to make changes that can allow for the village to work on it's own, without help from others. You have a budget of 1.0 unit.

You can move the village homes away from the river for free but you cannot open or use any protected scrubland areas. Villagers are not allowed to hunt in the protected wild-lands. Existing animal barns/stalls can be scrapped or moved to a different location for free. Volunteers in the village will get together to rebuild the barns at no cost. But no additional barns may be added without purchasing barn materials. Fencing materials have a one time cost of 0.3 or the current fencing could be left alone. Volunteers will also get together for free to remove fencing. If you want to plant crops, you must put down nutrient-rich, healthy soil first. If you buy 10 acres of dirt at .05 per acre, you have spent 50% of your budget!

This village has 150 inhabitants and 23 huts/homes. 1 acre of organic polycultured cropland can feed 50 people for 1 year. 1 acre of monoculture cropland can feed 50 people for 1 year, but you will also have to purchase vitamins and supplements for the villagers to take each year. Keep this in mind when figuring out your budget! Remember that the goal of the project is to create a self-sustainable village.

By growing additional crops, villagers could store extra food for emergencies or in the future they could sell it to pay for improvements for the village on their own.

If you decide the village will begin to practice organic polyculture farming, each acre must include the following:

1 acre healthy soil

¼ acre of leguminous crops (to add nutrients to the soil)

¼ acre of a crop of your choosing

¼ acre of a second crop of your choosing

¼ acre of non human-edible native plants (to provide habitat/food for birds and native wildlife)

6 trees (4 native and 2 fruit/nut trees) scattered throughout the cropland acre.

If organic polyculture farming will be used, there is no need to use pesticides and fertilizers. If you decide the village will continue monoculture commercial farming, then each acre of cropland must include the following:

1 acre pesticides

1 acre fertilizers

1 acre healthy soil

1 acre of any crop of your choosing

Monoculture farming means your croplands can only have 1 type of crop.

5 cows and 1 acre of organic polycultured cropland can feed 75 people for 1 year. 5 cows and 1 acre of monoculture cropland can feed 50 people for 1 year, but you will also have to purchase vitamins and supplements for the 50 villagers.

12 sheep and 1 acre of organic polycultured cropland can feed 75 people for 1 year. 10 sheep and 1 acre of monoculture cropland can feed 50 people for 1 year, but you will also have to purchase vitamins and supplements for the 50 villagers.

15 goats and 1 acre of organic polycultured cropland can feed 75 people for 1 year. 15 goats and 1 acre of monoculture cropland can feed 50 people for 1 year, but you will also have to purchase vitamins and supplements for the 75 villagers.

20 pigs and 1 acre of organic polycultured cropland can feed 75 people for 1 year. 20 pigs and 1 acre of monoculture cropland can feed 50 people for 1 year, but you will also have to purchase vitamins and supplements for the 50 villagers.

30 chickens and 1 acre of organic polycultured cropland can feed 75 people for 1 year. 30 chickens and 1 acre of monoculture cropland can feed 50 people for 1 year, but you will also have to purchase vitamins and supplements for the 50 villagers.

Animals are not a required part of the villagers' diets. Hunting is free, so if the village has prosperous and well developed croplands, with habitat for birds and other wildlife, the villagers will be able to hunt wild animals for food in the future.

If you are going to plant trees for erosion control each acre of land must have either 8 native trees plus an acre of healthy soil or 10 non-native trees plus an acre of soil (Remember, dirt first!).

You are not going to have enough to do everything that is needed to help reduce the impacts of the village's environmental and human health problems, so be wise and carefully plan out what you think this village will need to be sustainable on their own.

1.) Write a 2 page typed paper (12 point font, double line spacing) that explains your decisions for the village and what your budget was spent on. Your Environmental Management Plan should include explanations as to why and how environmental sustainability will benefit both the villagers and the environment. Explain what animals you will have (if any), what they are going to eat and if they are free range (roaming on pasturelands) or not (in stalls in a barn - don't forget about animal waste!). Explain how you are going to fertilize village crops. You must also include a plan on how you will educate the villagers, which is necessary for them to understand the changes that will be made. What did you do for irrigation? Will the villagers depend on natural rainfall for growing crops? What about waste (animals and humans)?

2.) Draw your changes on the blank map, add colors and include it as an appendix for your paper. Also create a colored key. The map should include different colors or symbols for each type of crop and a symbol or color for different types of trees. For example native trees could be "NT" and fruit/nut trees could be "FNT".

3.) Complete the "shopping list" Budget worksheet with all of the items you will purchase for the village and the quantity for each item. This can help you add up and record the total spent from your budget. Include the list as an appendix for your paper.

The budget outline can be found on page 4.

Budget Outline

You have a budget of 1.0

You cannot spend more than 1.0

Crops and Plants

- .05 acre of healthy soil
- .03 acre of non human-edible native plants
- .03 acre of leguminous crops
- .03 acre of soy
- .04 acre of edible vegetables
- .02 acre of corn
- .04 acre of millet
- .06 acre of grass
- .09 acre of wheat
- .02 4 native trees
- .03 4 fruit/nut trees
- .06 5 non-native trees

Livestock/work animals

- .01 1 herding dog
- .05 cow
- .05 3 sheep
- .05 5 pigs
- .05 3 goats
- .04 10 chickens
- .04 2 camels
- .04 2 alpacas or lamas
- .04 1 horse

Farming Supplies and other Materials

- .00 Labor for moving/rebuilding barns, fencing, villager homes
- .04 truck
- .10 50 barrels of fuel
- .03 1 barrel of pesticides (for ¼ acre)
- .03 1 bag of fertilizer (for ¼ acre)
- .02 1,000 meters water tarp (filters sediment from the water)
- .04 Eco-community school
- .09 Vitamins and supplements for 50 people for 1 year
- .03 two composting toilets (no water or electricity required)
- .03 all fencing materials
- .06 barn materials for 1 additional barn
- .20 water tower (to store water for use during times of drought)
- .60 artificial wetland (natural water treatment, wildlife habitat)
- .70 water treatment/decontamination plant
- .09 Granary (grain storage building)

Good luck, environmental planners!