MUHAMMED ENES ÇELİK

AGRICULTURE TRACKING TOOL on python

This is a tool for simulating the population growth of cows for keepers. It helps to guess income, outcome and sources needed to contibue this business using population dynamics data.

I have aimed to create a population growth simulator algorithm in python language.

This algorithm, takes several inputs from the user and makes a simulation using these input data. The Inputs are datas such as average pregnancy period of cows, daily milk production,milk price,meat price, gestational age, slaughter age of bulls, death ration in newborn calves etc. Using these inputs algorithm creates a guess for a period of time. It assumes gender ratio in borns as 50% for both female and male as it is in the nature of majority of mammals. During the calculations ,it creates a scenerio as calves die in the ratio of "death ratio" given by the user. Kills male cows when they reach the slaughter age and add the profit to the "meat safe"income source. Also calculates the milk production income using female population data. Gestational age for female cows is assumed to be 15 months.This is the age when females get pregnant and after 12 months they give a birth. 12 month is not a random duration It includes the average pregnancy duration for cows ,plus 3 months is the average recovery duration.

I have used "random" library in python to assump the number of the dead calves and also to determine the genders of calves when the births that are given are in odd numbers.

 I iterated the ages every month, for each groups of cows which are resembled as 1,2,3,4…12 months of pragnancy for mother cows; 1,2,3…15 months old female calves and from 1 to 12 months aged male calves /bulls. Including gender distribution and giving a death ratio to calves makes simulation realistic .User can define milk and meat price, death ratio, average daily milk production amount for a cow and how long this busines will be run. After this duration calculated population , production and income is returned. It is actually a probability guess because fate of every calve(gender, death,givng birth) changes the output.

To estimate the average outcome of the simulation is user is aked to input what the best and worst scenerio is for the farmers' market aspects. According to these aspects an outcome is preasumed. Such example of running the code is given below:

Input initial cow population: 3

Months to calculate: 37

Average Male Price: 150000

Input average daily milk production in Liters: 12

Input average milk price per Liter: 20

Input Death Rate for newborn calves: 10

Show each month data? (1 or 0):   0

Output Datas:

Total Population: 7

Average Monthly Milk Production: 1187.027027027027 Average Monthly Milk Income: 23740.54054054054

Average Monthly Total Income: 35902.7027027027

Total Income: 1328400

Net worth of current population: 825000.0

After these questions population growth is displayed for each month(optional) and at the and total population, income and current net worth of the animals at total is displayed.

I also wanted the aging treshold points to be adjustable but I couldn't manage to create such system yet. Ather than that all income expectations and growth assumptions are both realistic and observable through the monthly data display. The genders, ages and existence of each animals are observable. Of course in reality each animal is unique so expecting a seperated data outcome for each animal without individual datas is impossible. That leaves the simulation as being an assumption tool after all.

All codes belong to myself.