

Quantitative Summary Document

The game has been continued on from the last mission of FOOD FORCE I in which the user is given a task to rehabilitate a village.

In FOODFORCE II we provide the player with some initial resources and some money, and we ask him to setup facilities like hospitals, schools, workshops etc. which increase the indicators of the village. These indicators describe the level of prosperity and development in the village. The Resources, Indicators and Facilities are listed below -:

RESOURCES -:

- 1.1. Building Material
- 1.2. Tools
- 1.3. Medicine
- 1.4. Books
- 1.5. Water
- 1.6. Food -: This resource is further classified
 - a.) Rice
 - b.) Wheat
 - c.) Beans
 - d.) Sugar
 - e.) Salt
 - f.) Oils

INDICATORS -:

1. Housing
2. Health
3. Nutrition
4. Education
5. Training

FACILITIES -:

1. House
2. Hospital

3. School
4. Workshop
5. Farm
6. Fountain

Other than the resources listed above the player is also provided with Money through which he can buy resources from the market and also increase the money of the village by selling the surplus resources produced by the facilities in the village.

The price of each resource is dependent on the market forces i.e the amount of the resource which is present with the village and the market with respect to the maximum amount of resources they can hold.

The player is also required to handle his Manpower resources , he would also be required to take care that he has enough manpower resources to work on different facilities and also to construct them. At the start of the game, the player would be provided with some manpower , money and only some of the resources and he would be required to setup the facilities.

Facilities consume some resources and produce some resources too and they increase the indicator levels of a village. The user would be provided with some initial building material, tools, water, medicine and food (which is distributed in sub classes). To build the facilities he would be required to have some building material, tools and water. Also some of the manpower would be employed to construct these facilities, once the construction is complete these manpower resources would be dis-allocated or made free.

And once the facilities are constructed they would be requiring some resources to run them and also they would be allocating some manpower resources too, for running the facility.

e.g if we consider the construction and working of a hospital

We would require some initial building material presently taken as 25 units, tools taken as 20 units and water taken as 8 units,(all these constants have been defined in a constants file which can be appended) also it would require 10 people to build that facility. Once the building of the hospital is complete these people would be dis-allocated and would be added to the pool of unemployed people. Once the building of the hospital has been complete it will be using medicines as resources and would be increasing the number of people which are being provided health.

But there are some restrictions also, i.e if there are not enough manpower or resources to construct/run a facility the program will raise an exception and tell the user that he cannot establish the facility due to insufficient resources.

Also if the resources that a facility is using for running fall less wrt the requirement , then the facility is temporarily stopped and it can be resumed once the user provides enough resources for the facility to run either by buying them from the market or if any other facility produces them.

We also take care that each person in the population is employed at only one place, we do so by maintaining a record of all those people who are currently unemployed and allocating manpower to build or work at a facility only through those pool of unemployed people and add the no of people unemployed if work of any person finishes. Also we have made provisions to increase the population of the village at certain intervals. All other resources except food and the facility farm are maintained in the same way as that explained for the hospital.

Regarding food it has been divided into sub-categories of rice, wheat, beans, sugar, salt and oils. Each of these items are provided a nutritive value in terms of “vitamins”, “protiens” and “carbohydrates”. This will teach the player importance of a balanced diet for an individual. The nutrition indicator depends on the quantity of food (keeping in mind the total need, its actually considering the number of people who can be fed by that amount of food wrt to the total population) that is being produced and also the quality of the food that is being produced. By, quality i mean that whether or not the food is containing the right balance of vitamins, protiens and carbohydrates.

We can specify with every farm, what amount of food the farm can produce and allow him to select that what percentage of each food item does he wants to produce.

Also, we have provided the player with an option of upgrading his facilities, upgrading a facility does consumes some resources but no manpower is required to just upgrade the facility. Upgradation of facility increases the consumption of resources by the facilities and also increase the production of resources by the facilities although the increase in production is double than the increase in consumption of the resources. It is assumed that upgradation of facilities does not require more manpower to run those facilities.

Another important factor is time, it is always increasing with each turn but we stop the time temporarily when the user wants to buy or sell resources as we need to provide him with a seperate menu to buy and sell the resources. We do the same thing when we ask the player to enter the percentages of different food items that he wants to produce in the farms.

And regarding the natural calamities like earthquakes, floods and famine. We can do them easily through the current code base by making the following changes in the database -:

1. Earthquake -: We can reduce the no of installations of some of the facilities like Hospitals, Schools , Houses and Workshops as an earthquake wouldn't be affecting installations like Farms and Fountain. We can also decrease the population in such a scenario.
2. Famine -: In such a scenario we can heavily decrease the production of he farms and also increase the price of food commodities.
3. Floods -: Here we can increase the village quantity of water to a great extent, thereby decreasing the price of water. We can also decrease the production of farms and stop the working of a few facilities for certain number of turns.

Still there are some issues which need to be decided upon -:

1. Whether we need to increase the population with time or not. This decision can be considered fair on the following basis, firstly, it is natural. Secondly, considering the difficulty level, it would increase the demand of food and water but at the same time the player would be able to setup more and more facilities.
2. Whether to keep a maximum limit to the number of installations of a facility, number of upgradations of a facility(the present code base allows a maximum of 10 installations and 5 upgrades). Also, whether to keep a maximum limit to the amount of resources that the village can hold, after the maximum amount of resources that a village can hold the, we expect the player to be a little smart and expect him to sell the resources to the market, so that he can increase the money and use that monay for some other purpose, there is presently no upper limit to the money.
3. I also had this idea in mind that if uniform development of village is taking place then we can award the player, e.g -: If all the indicators have crossed the limit of 25% i.e 250 out of 1000 and also all the indicators are in the range of 25-30%, which indicates a uniform development, in such a case we can reward the player with a special donation from the WFP in which we can increase the resources present with him and upgrade one or two facilities with the player. The current code base doesn't implement this.

I am also copying the contents of Contants Files, that we are using to get the values of all the initial variables, in this document.

INITIAL CONSTANTS:

INITIAL VALUES OF INDICATORS

INIT_HOUSING = 0.0

INIT_NUTRITION = 0.0

INIT_HEALTH = 0.0

INIT_TRAINING = 0.0

INIT_EDUCATION = 0.0

INITIAL NUMBER OF FACILITIES

INIT_HOUSE = 4

INIT_HOSPITAL = 0

INIT_WORKSHOP = 0

INIT_SCHOOL= 0

INIT_FARM = 1

INIT_FOUNTAIN = 0

MONEY

INIT_MONEY = 10000

MAX_MONEY=999999999999L

INITIAL VALUES OF RESOURCES

VILLAGE QUANTITY

RESOURCES

INIT_WATER = 1000

INIT_BUILDMAT = 1000

INIT_TOOLS = 1000

INIT_MEDICINE = 100

INIT_BOOKS = 0

FOOD RESOURCES

INIT_RICE = 500

INIT_WHEAT = 500

INIT_BEANS = 500

INIT_SUGAR = 500

INIT_SALT = 500

INIT_OILS = 500

##MARKET QUANTITY

RESOURCES

INIT_M_WATER = 10000

INIT_M_BUILDMAT = 10000

INIT_M_TOOLS = 10000

INIT_M_MEDICINE = 2000

INIT_M_BOOKS = 2000

FOOD RESOURCES

INIT_M_RICE = 2000

INIT_M_WHEAT = 2000

INIT_M_BEANS = 2000

INIT_M_SUGAR = 2000

INIT_M_SALT = 2000

INIT_M_OILS = 2000

INITIAL COST OF RESOURCES PER UNIT (ASSUMPTION : THE COST OF RESOURCES
IN MARKET AS WELL AS FOR THE VILLAGE IS SAME)

COST_WATER = 15

COST_BUILDMAT = 15

COST_TOOLS = 15

COST_MEDICINE = 10

COST_BOOKS = 10

COST_RICE = 10
COST_WHEAT = 10
COST_BEANS = 12
COST_SUGAR = 8
COST_SALT = 8
COST_OILS = 12

BOUNDS ON INDICATORS AND RESOURCES AND FACILITIES

MAX_INDICATOR = 1000 # MAXIMUM VALUE OF AN INDICATOR
MAX_NO_INS_FACILITY = 10 # MAXIMUM NO. OF INSTALLATIONS OF A FACILITY
MAX_LEVELS_FACILITY = 5 # MAXIMUM NO OF LEVELS OF A FACILITY
LEVEL_INCR_PROD = 0.4 # INCREASE IN PRODUCTION RATE WITH UPGRADATION
LEVEL_INCR_CONS = 0.2 # INCREASE IN CONSUMPTION RATE WITH UPGRADATION
MAX_RES_VAL_VILLAGE = 10000 # MAXIMUM VALUE OF RESOURCE THAT VILLAGE CAN HOLD
MAX_RES_VAL_MARKET = 100000
PRICE_VARIATION = 10 # MAXIMUM PRICE VARIATION

DICTIONARIES REGARDING NUTRITIVE VALUES OF FOOD (THEY ARE IN %)

RICE_NUTRITION = { 'PROTIENS' : 0.30 , 'FATS' : 0.50 , 'VITAMINS' : 0.20 }
WHEAT_NUTRITION = { 'PROTIENS' : 0.15 , 'FATS' : 0.70 , 'VITAMINS' : 0.15 }
BEANS_NUTRITION = { 'PROTIENS' : 0.40 , 'FATS' : 0.20 , 'VITAMINS' : 0.40 }
SUGAR_NUTRITION = { 'PROTIENS' : 0.30 , 'FATS' : 0.55 , 'VITAMINS' : 0.15 }
SALT_NUTRITION = { 'PROTIENS' : 0.40 , 'FATS' : 0.10 , 'VITAMINS' : 0.50 }
OILS_NUTRITION = { 'PROTIENS' : 0.35 , 'FATS' : 0.20 , 'VITAMINS' : 0.45 }

#MANPOWER CONSTANTS

INIT_PEOPLE = 200.0 # INITIAL NUMBER OF PEOPLE

FOOD_PP= 2 # FOOD CONSUMED PER PERSON IN ONE TURN
MAX_PER_FOOD_CONS = 30 # MAXIMUM AMOUNT OF FOOD THAT CAN BE
CONSUMED IN ONE TURN E.G IF THE VILLAGE HAS 200 FOOD IN TOTAL (SUM OF
RICE WHEAT AND ALL) THEN AT ONE TURN IT CAN CONSUME MAXIMUM OF 30% OF
IT i.e. 66 UNITS

FACILITIES CONSTANTS:

DICTIONARIES REGARDING RESOURCES REQD TO BUILD EACH FACILITY PER BUILDING

```
COST_HOUSE = {'BUILDING MATERIAL' : 5.0 , 'TOOLS' : 5.0 , 'WATER' :3.0 }
COST_HOSPITAL = {'BUILDING MATERIAL' : 25.0 , 'TOOLS' : 20.0 , 'WATER' : 8.0 }
COST_SCHOOL = {'BUILDING MATERIAL' : 20.0 , 'TOOLS' : 20.0 , 'WATER' : 8.0 }
COST_WORKSHOP = {'BUILDING MATERIAL' : 25.0 , 'TOOLS' : 10.0 , 'WATER' : 10.0 }
COST_FARM = {'BUILDING MATERIAL' : 0.0 , 'TOOLS' : 5.0 , 'WATER' : 15.0 }
COST_FOUNTAIN = {'BUILDING MATERIAL' : 10.0 , 'TOOLS' : 20.0 , 'WATER' : 0.0 }
```

MANPOWER REQD TO BUILD EACH FACILITY PER BUILDING

```
MANP_REQD_BUILD_HOUSE = { 'EMPLOYED PEOPLE IN CONSTRUCTION' : 2.0 }
MANP_REQD_BUILD_HOSPITAL = { 'EMPLOYED PEOPLE IN CONSTRUCTION' : 10.0 }
MANP_REQD_BUILD_SCHOOL = { 'EMPLOYED PEOPLE IN CONSTRUCTION' : 8.0 }
MANP_REQD_BUILD_WORKSHOP = { 'EMPLOYED PEOPLE IN CONSTRUCTION' : 4.0 }
MANP_REQD_BUILD_FARM = { 'EMPLOYED PEOPLE IN CONSTRUCTION' : 2.0 }
MANP_REQD_BUILD_FOUNTAIN = { 'EMPLOYED PEOPLE IN CONSTRUCTION' : 4.0 }
```

DICTIONARIES OF RESOURCES REQD TO UPGRADE A FACILITY PER BUILDING
(ASSUMPTION : NO MANPOWER IS REQD TO UPGRADE A FACILITY)

```
COST_LEVEL_HOUSE = {'BUILDING MATERIAL' : 2.0 , 'TOOLS' : 2.0 }
COST_LEVEL_HOSPITAL = {'BUILDING MATERIAL' : 10.0 , 'TOOLS' : 5.0 }
COST_LEVEL_SCHOOL = {'BUILDING MATERIAL' : 8.0 , 'TOOLS' : 5.0 }
COST_LEVEL_WORKSHOP = {'BUILDING MATERIAL' : 10.0 , 'TOOLS' : 5.0 }
```

```
COST_LEVEL_FARM = { 'BUILDING MATERIAL' : 0.0 , 'TOOLS' : 3.0 }
COST_LEVEL_FOUNTAIN = { 'BUILDING MATERIAL' : 2.0 , 'TOOLS' : 5.0 }
```

```
# DICTIONARIES OF RESOURCES BEING CONSUMED BY EACH FACILITY PER BUILDING
```

```
CONS_HOUSE = { }
CONS_HOSPITAL = { 'MEDICINE' : 2.0 , 'WATER' : 5.0 }
CONS_SCHOOL = { 'BOOKS' : 2.0 , 'WATER' : 2.0 }
CONS_WORKSHOP = { }
CONS_FARM = { 'WATER' : 10.0 }
CONS_FOUNTAIN = { }
```

```
# DICTIONARIES OF RESOURCES BEING PRODUCED BY THE FACILITY PER BUILDING
```

```
PROD_HOUSE = { }
PROD_HOSPITAL = { 'MEDICINE' : 1.0 }
    # WE CAN MAKE IT TO ZERO EVEN
PROD_SCHOOL = { }
PROD_WORKSHOP = { 'TOOLS' : 15.0 }

PROD_FARM = { 'RICE' : 25.0 , 'WHEAT' : 25.0 , 'BEANS' : 25.0 , 'SUGAR' : 25.0 , 'SALT'
: 25.0 , 'OILS' : 25.0 } #THIS HAS TO BE DECIDED BY THE USER, BY
    #DEFAULT THEIR VALUE HAS BEEN PUT EQUAL TO
    #25, TODO: FOR CONTROLLER FILL IN THE
    #VALUES OF RICE ETC IN %

PROD_FOUNTAIN = { 'WATER' : 25 }
```

MANPOWER DISTRIBUTION CHANGED BY EACH FACILITY TO RUN THE FACILITY,
THIS WILL INCREASE OR DECREASE AT BUILDING OR UPGRADATION OF A FACILITY
AND NOT AT EVERY TURN

MANP_DIST_HOUSE = { }

MANP_DIST_HOSPITAL = { 'EMPLOYED PEOPLE IN HOSPITAL' : 10.0 }

MANP_DIST_SCHOOL = { 'EMPLOYED PEOPLE IN SCHOOL' : 8.0 }

MANP_DIST_WORKSHOP = { 'EMPLOYED PEOPLE IN WORKSHOP' : 10.0 }

MANP_DIST_FARM = { 'EMPLOYED PEOPLE IN FARM' : 10.0 }

MANP_DIST_FOUNTAIN = { }

CHANGE IN MANPOWER DISTRIBUTION DUE TO THE FACILITIES

MANP_CH_HOUSE = { 'SHELTERED PEOPLE' : 4.0 }

MANP_CH_HOSPITAL = { 'HEALTHY PEOPLE' : 25.0 }

#BY HEALTHY PEOPLE I MEAN THE NUMBER OF

#PEOPLE THAT CAN BE MADE HEALTHY BY A HOSPITAL

MANP_CH_SCHOOL = { 'EDUCATED PEOPLE' : 20.0 }

MANP_CH_WORKSHOP = { }

MANP_CH_FARM = { }

MANP_CH_FOUNTAIN = { }

INDICATORS CONSTANTS

PDICT_HOUSING = { 'SHELTERED PEOPLE' : 1 }

PDICT_HEALTH = { 'HEALTHY PEOPLE' : 0.5 , 'NUTRITION' : 0.3 , 'WATER' : 0.2 }

BY NUTRITION I MEAN THE NUTRITION INDICATOR

PDICT_NUTRITION = { 'PEOPLE FED' : 0.3 , 'PROTEINS' : 0.3 , 'FATS' : 0.1 , 'VITAMINS' : 0.3 }

WE WOULD BE REQUIRED TO CALCULATE THE AMT OF PROTEINS ETC. FROM THE VALUE OF RICE ETC.

PDICT_EDUCATION = { 'EDUCATED PEOPLE' : 0.6 , 'LEVEL OF EDUCATION' : 0.4 }

PDICT_TRAINING = { 'LEVEL OF WORKSHOPS' : 0.4 , 'EMPLOYED PEOPLE IN WORKSHOP' : 0.25 , 'EMPLOYED PEOPLE IN FARM' : 0.2 , 'EMPLOYED PEOPLE IN HOSPITAL' : 0.1 , 'EMPLOYED PEOPLE IN CONSTRUCTION' : 0.05 }

THESE VALUES ARE GIVEN IN RATIOS THE ACTUAL VALUE OF AN INDICATOR IS CALCULATED IN THE FOLLOWING WAY

INDICATOR VALUE = $(\sum (\text{current value of the factor} / \text{maximum value of that factor}) * \text{ratio of its dependency as given in above tables}) * \text{maximum value of the indicator (1000 currently)}$

I hope that this document would have given you quite a good idea overview of the features that we are planning to implement in FOODFORCE II.

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