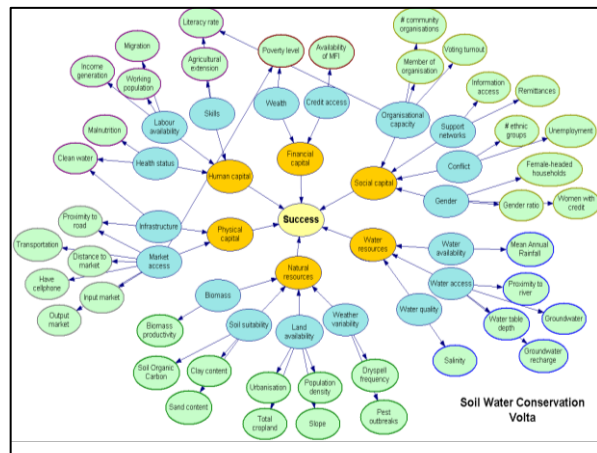
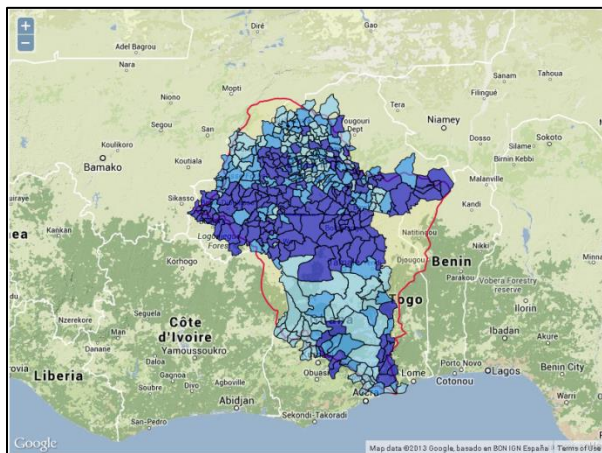


TAGMI Bayes Network Model Result Maps and Network Images for the Volta Basin



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Bayesian Network Model in Detail

The Bayesian Model calculates a desired outcome, ‘**Success**’, which is the likelihood that an AWM technology introduced in a target community will still be in use 2 years after the intervention project has ended. Based on participants’ discussions, and using the DFID Sustainable Livelihood Framework (DFID, 1999), ‘**Success**’ is conditional on adequate levels of 5 **capitals**: Human, Social, Financial, Physical and Natural. Water resources are included as a separate 6th capital given its centrality to AWM. Each **capital** comprises 2-4 key **factors** (e.g. Human capital is a combination of **Labour availability**, **Skills**, and **Health**). Each **factor** is described by 1-3 **data variables**, which are the foundation of the model (e.g. **Labour availability** is indicated by the relative size of the **working age population** and the **gender ratio** in the population).

The **linking arrows** convey the conditional probabilities of how each node in the network influences the presence of the next node. The model calculates the probability that the **factor** is present given knowledge about the state of its **data variable** (high, medium or low), then the probability that the **capital** is present given the calculated state of its **factors**, then the probability that **success** is present given the calculated state of all capitals. A similar application of Bayesian network modeling to analyse the likelihood of water poverty is explained in detail in Kemp-Benedict et al. (2009).

Interpreting the result

The resulting ‘**likelihood of success**’ is influenced by:

The data itself

- the data distribution is standardised: all data is classified into 3 categories (low-med-high) of equal numbers of districts
- results therefore show relative differences across districts
- the data quality may skew the distribution: where coarser data is allocated to the district-level, large blocks of districts with similar values are created

The importance of the data

- the conditional probability tables linking the data to the factors reflect both the *type* (positive or negative) and *strength* (very strong - strong - weak) of the relationship between the data and the factor
- a *very strong* relationship has more effect on the value of the factor, and therefore contributes more to the final result, than a weak relationship
- most of the data is set to a very strong relationship with the factor it represents, unless expert input indicated otherwise

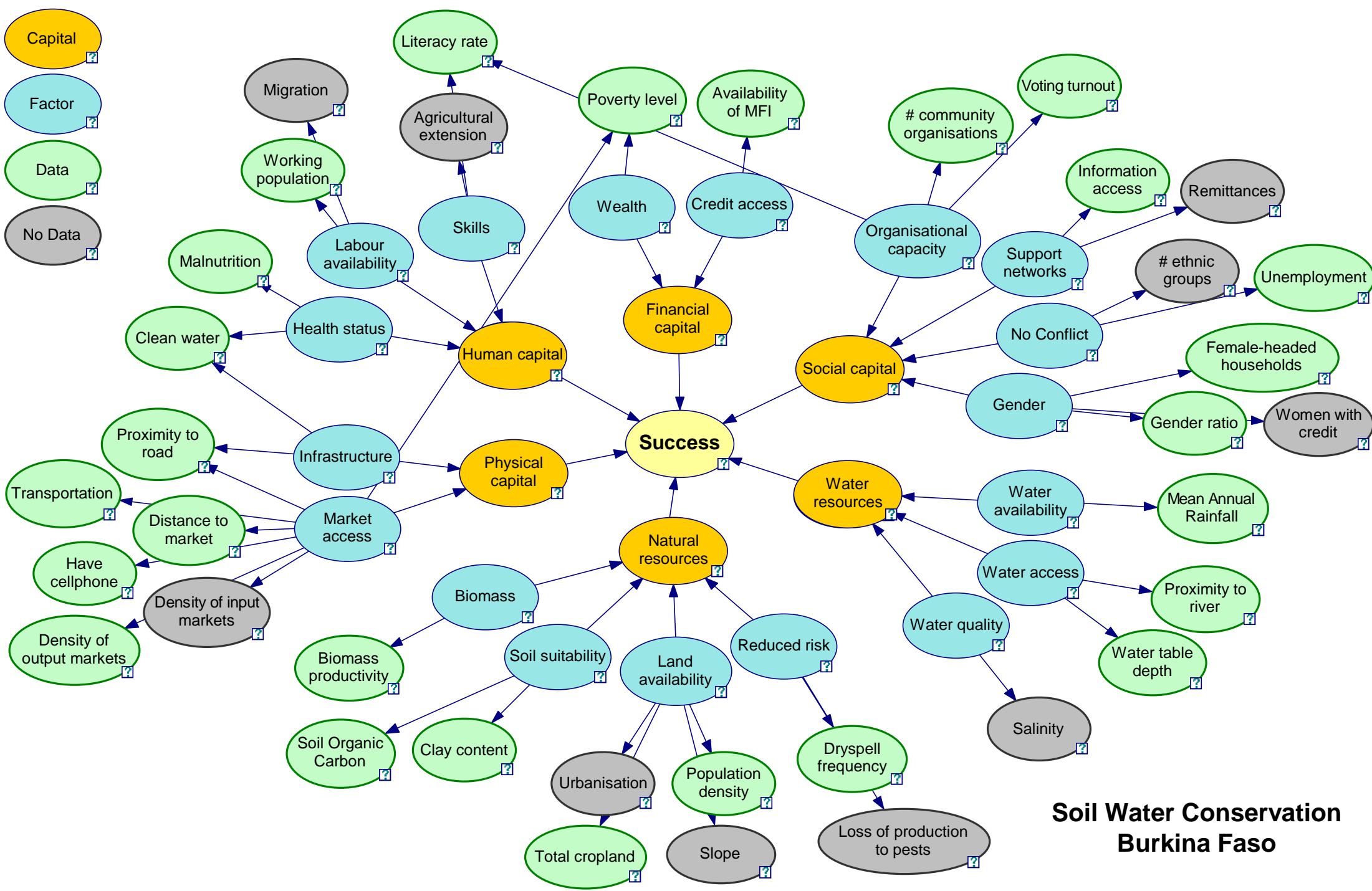
The importance of the factors

- the calculated value of each factor also carries a weight that reflects how much it contributes to achieving the capital it belongs to - e.g., do **Health status**, **Labour availability** and **Skills** contribute equally to achieving **Human capital** or not?
- a factor with a high weight will have more effect on the value of the capital, and therefore contribute more to the final result, than a factor with a low weight

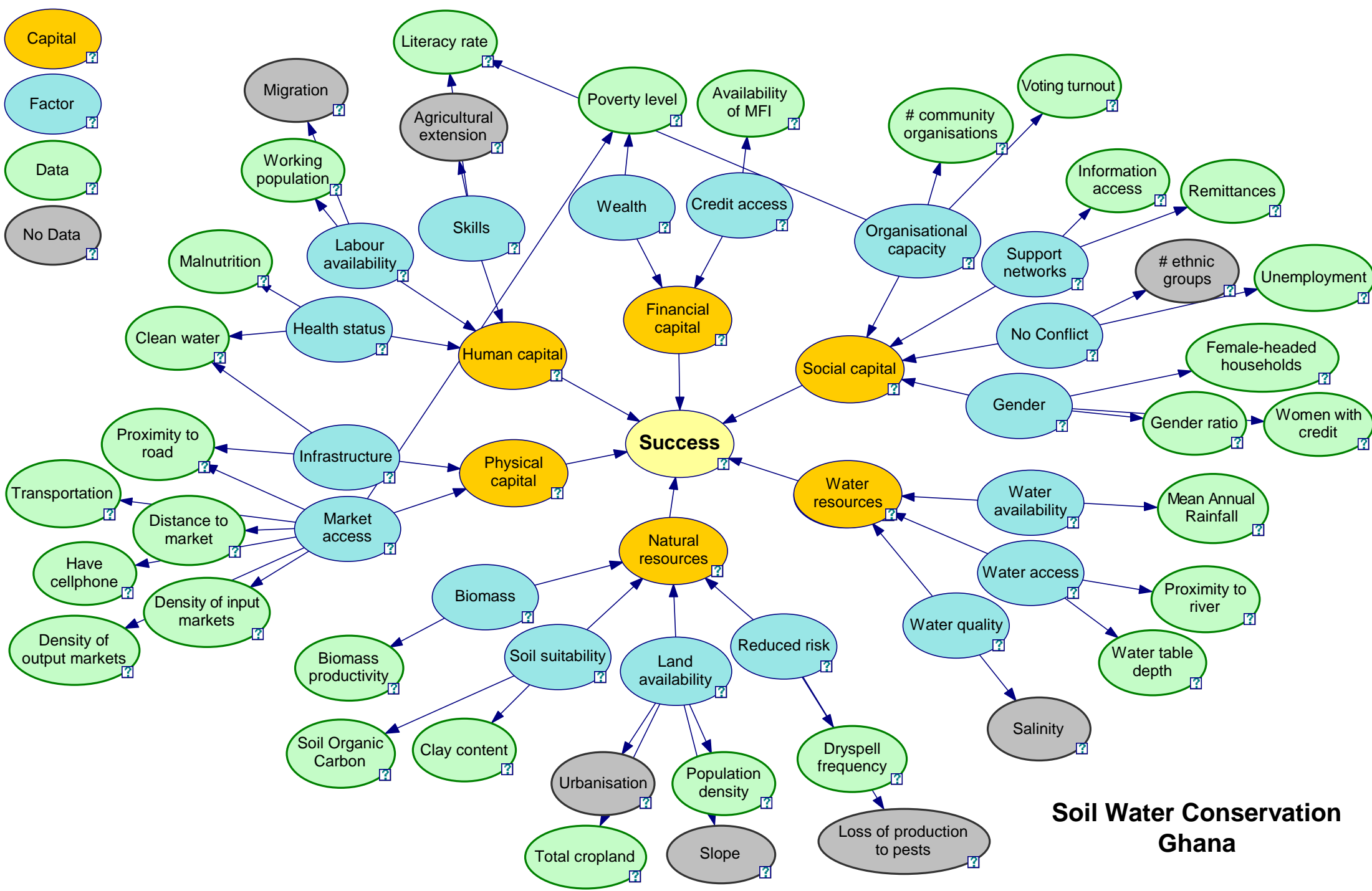
The importance of the capitals

- the calculated value of each capital also has a weight which reflects how necessary that capital is to achieving long-term success of the project:
 - if a capital that is essential is absent, the likelihood of success will be significantly reduced
 - if the capital is important but not essential, the likelihood of success will not be much affected



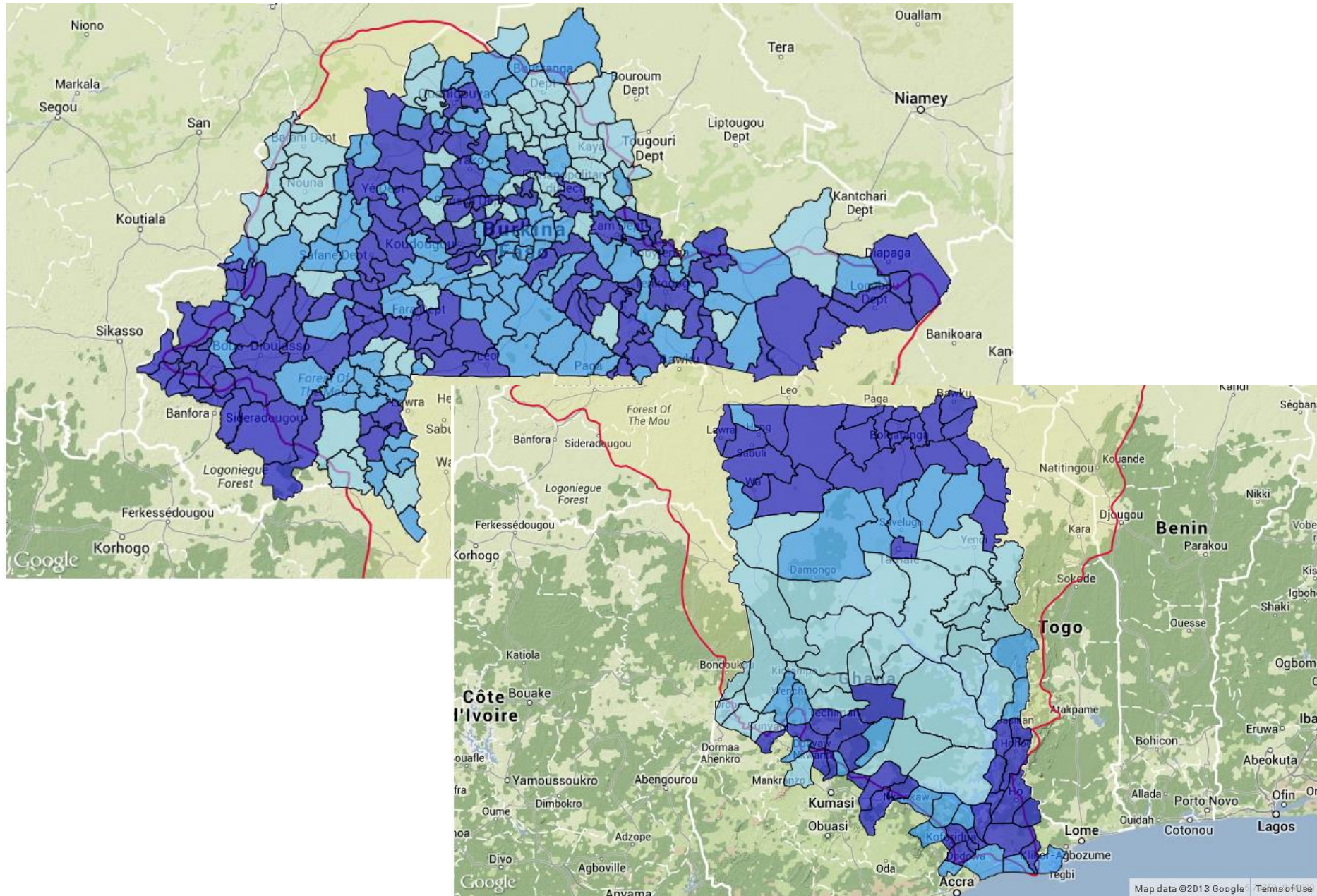


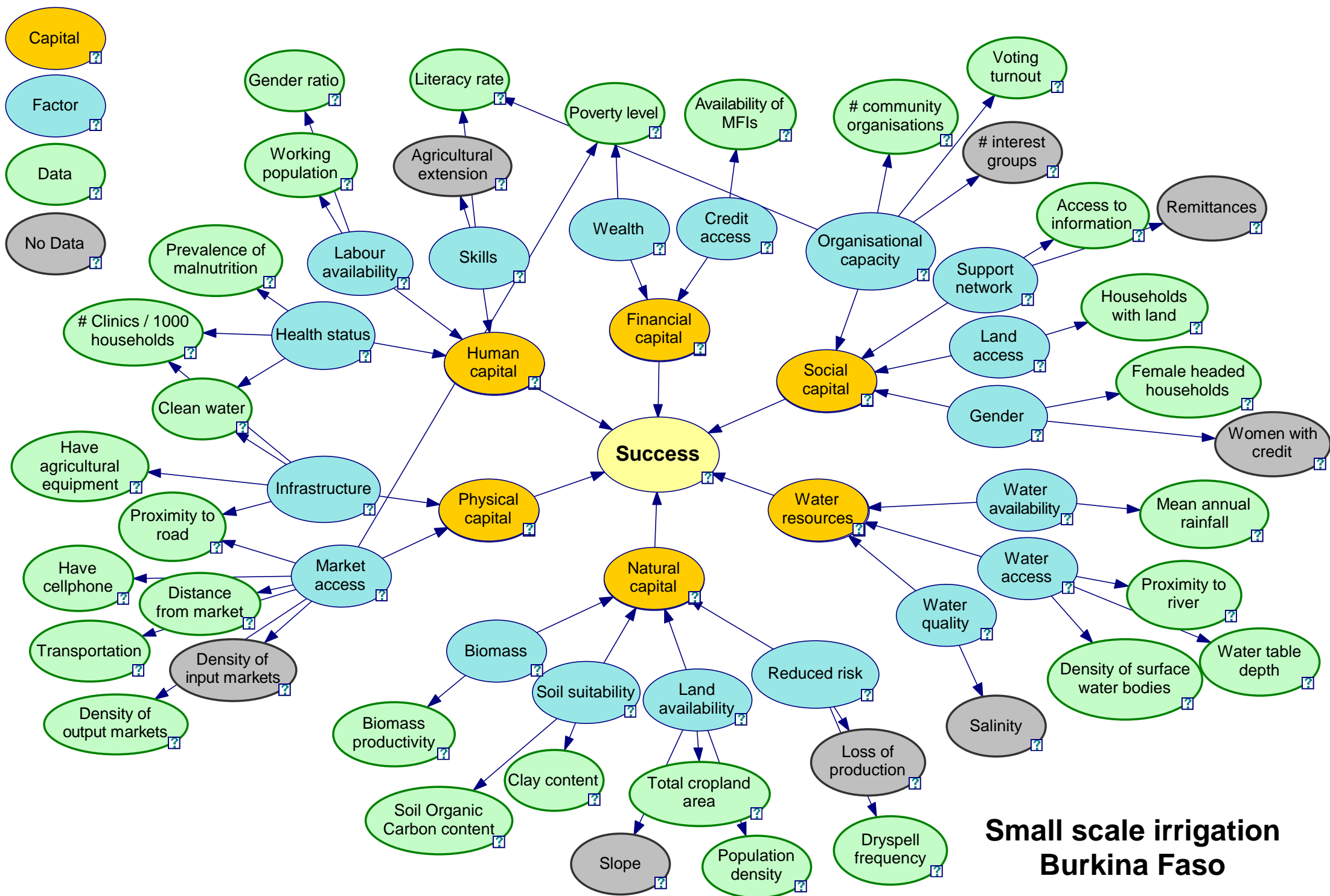
**Soil Water Conservation
Burkina Faso**

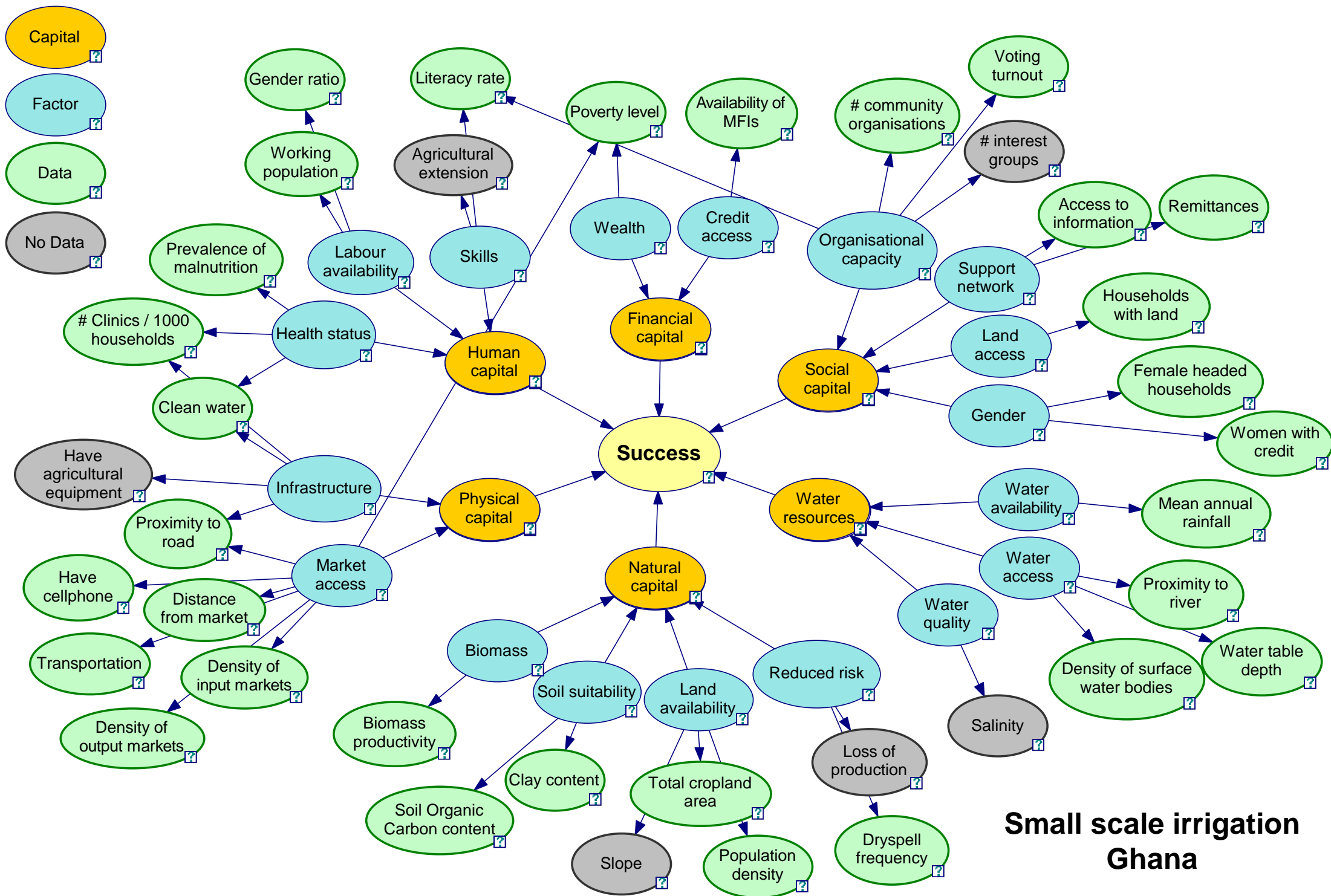


**Soil Water Conservation
Ghana**

Small scale irrigation

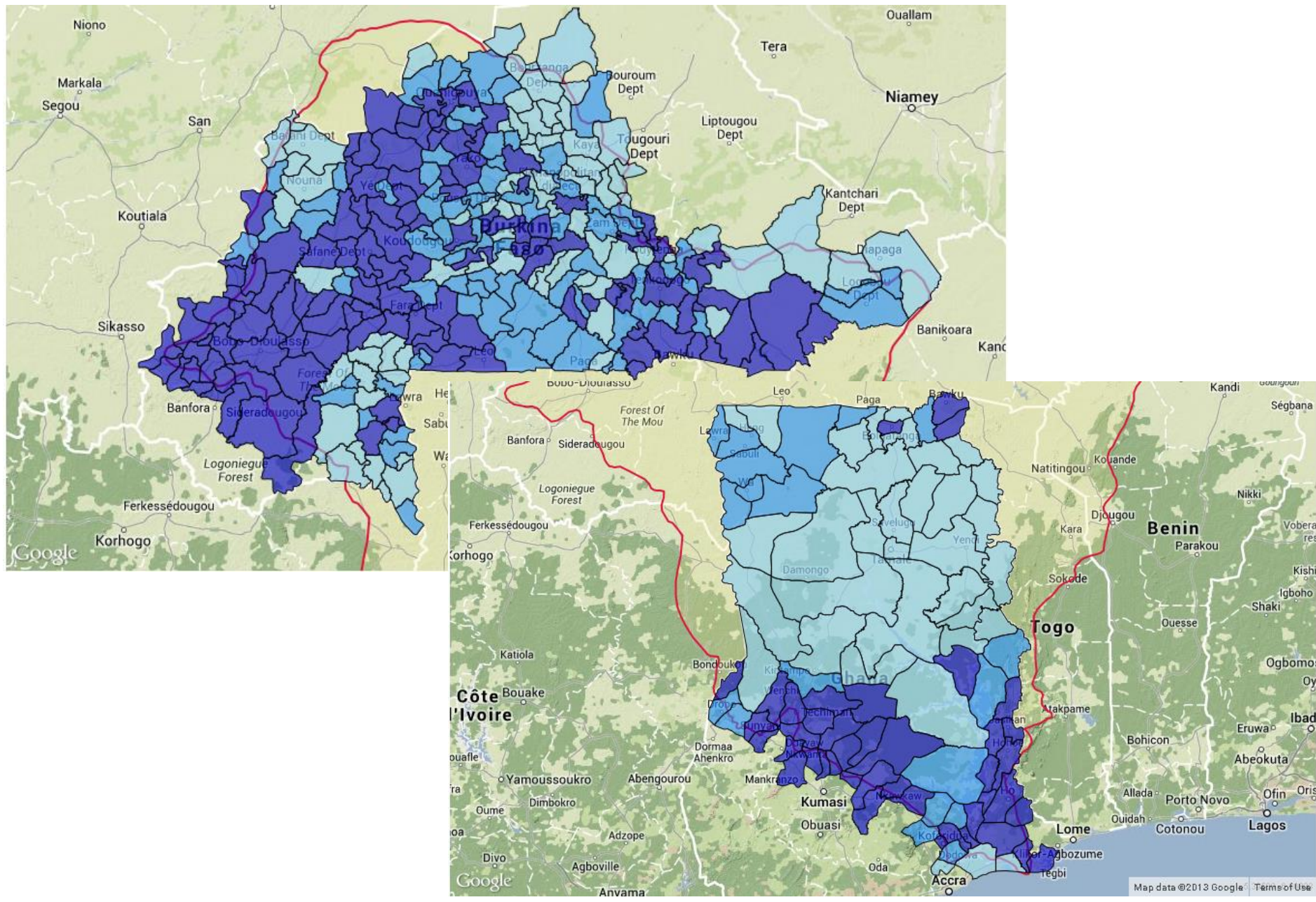


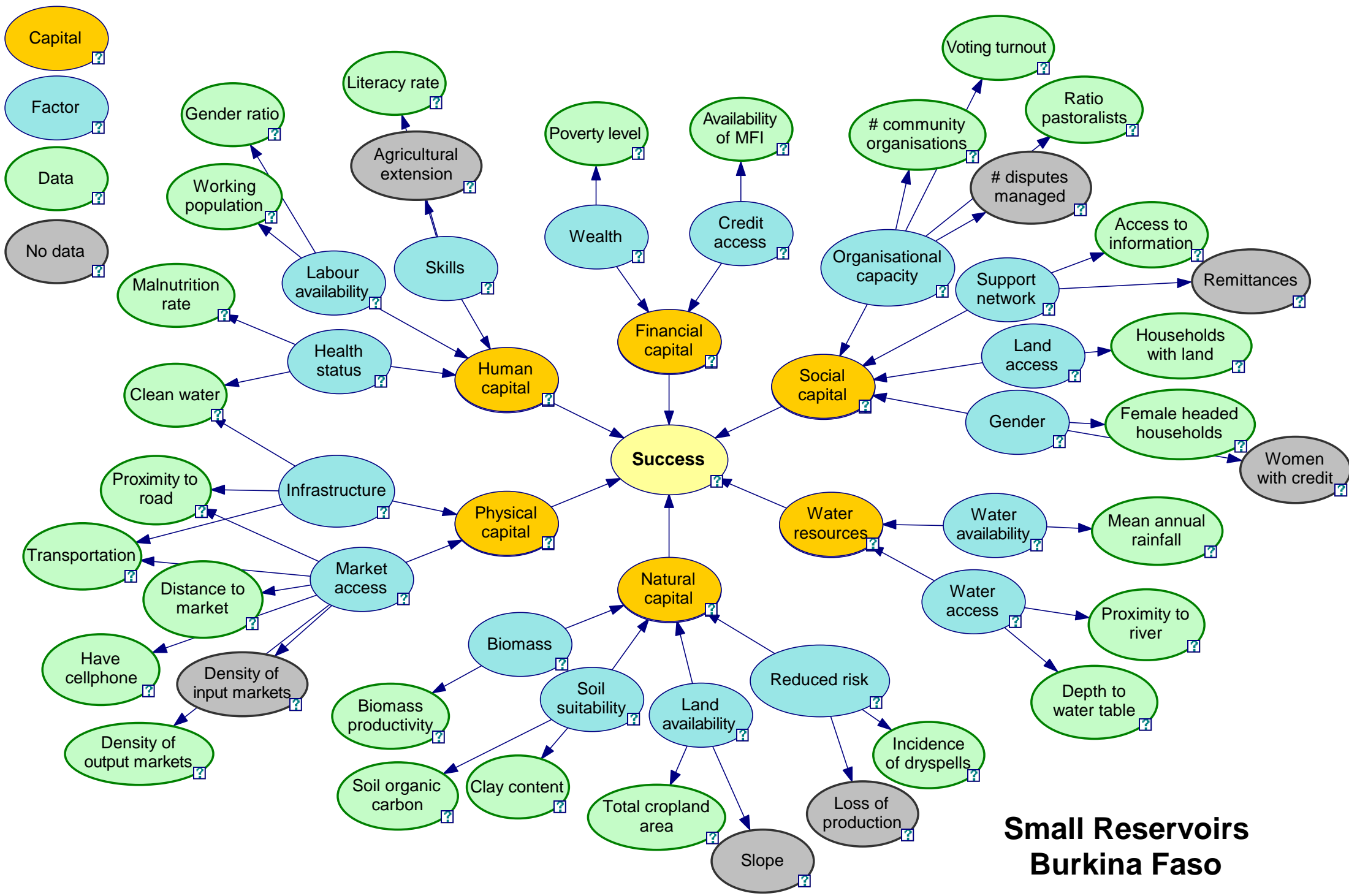




**Small scale irrigation
Ghana**

Small reservoirs





**Small Reservoirs
Burkina Faso**

