

FACILITATOR GUIDE

Agritopia

ALPS (Agriculture and Land Policy Simulator)

Agritopia is an experience for participants to consider the implications of agricultural policy decisions. A lively role-playing game for groups, participants will debate agricultural policy and learn their decisions' effects on the country's future. Agritopia allows participants to explore the interconnected dynamics of economic development, agriculture policy, and climate change. It uses an interactive computer model, the Agriculture and Land Policy Simulator (ALPS), to rapidly analyze the results of the decisions made during the event.

ALPS is a System Dynamics model based upon actual agricultural policy models. It was developed by Climate Interactive in partnership with Mohammed VI Polytechnic University (UM6P). The assumptions and policy questions are based on data and materials from Morocco and Ethiopia, but are adapted to represent Agritopia, a fictional African country that faces an amalgam of issues relevant in Africa.

Some of the calculations in the model are represented in Figure 1 which is available to participants as they participate in the exercise. Using the model as well as their own understanding and negotiation skills, participants have the opportunity to assume the role of leaders of Agritopia and to negotiate agricultural policy to achieve their goals for the country.

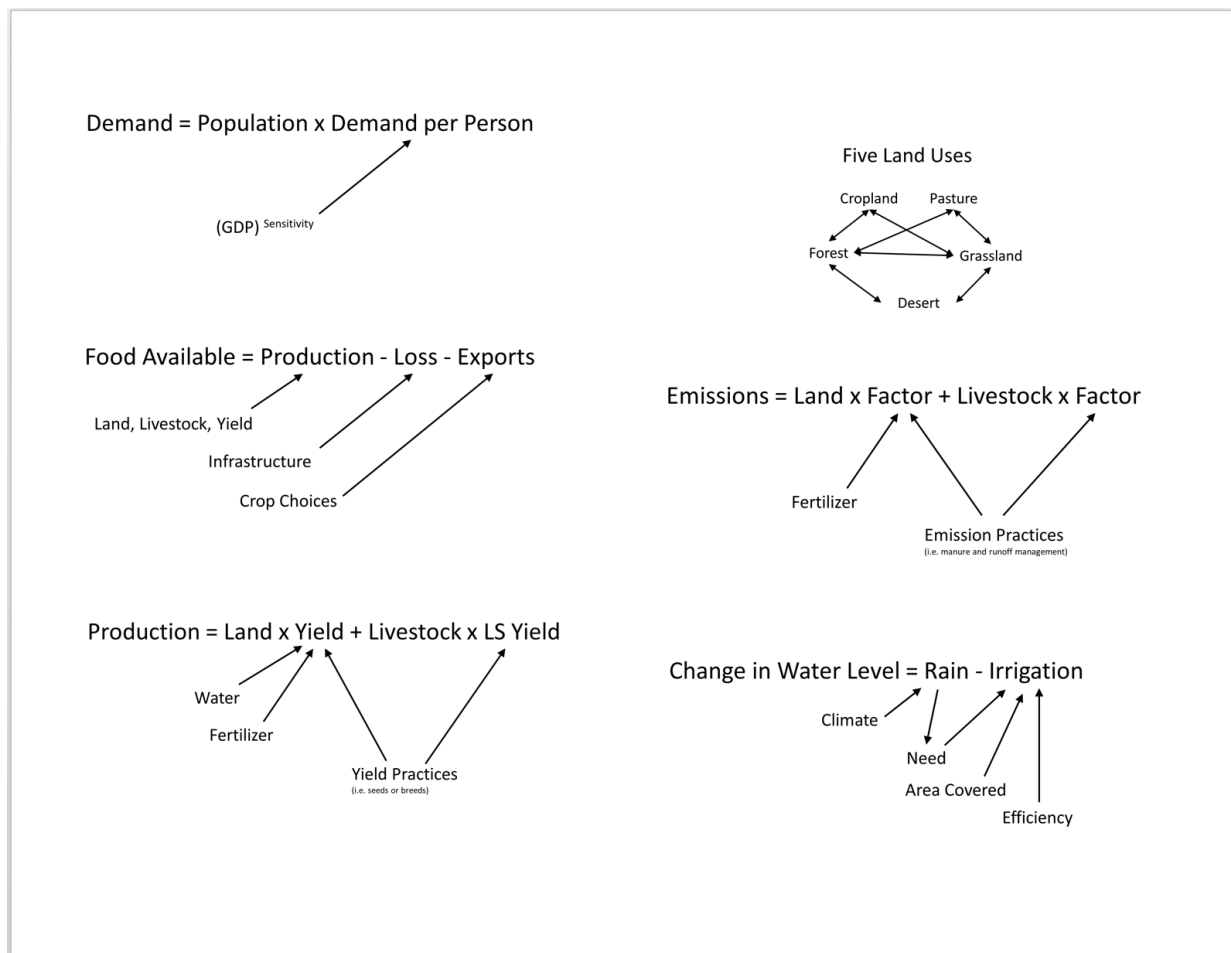


Figure 1: Calculations in ALPS

The Setting

In Agritopia, the population is growing at a rate of 2.3% per year which is equal to that of the average African country. The economy, while starting from a low base is seeing substantial GDP growth of 3% per year as the country develops. The result is a growing demand for food, both to meet basic needs and to meet the increasing expectations of the developing country. While food supply is generally keeping up with demand, some go hungry. There is an overarching imperative by all to produce enough to feed the growing population. There is also a desire to expand production more generally as well as to export to other countries, in a bid for economic growth.

Climate Change is a given and while Agritopia is not a significant contributor, they do play a part. Rainfall is highly variable and climate change is anticipated to contribute to increasing threat of drought. As food production increases to meet the needs of the growing population and economy, there is growing tension as the agricultural sector cuts down forests, increases use of scarce water resources, and contributes to carbon emissions.

The leaders of Agritopia are increasingly aware of the challenges of meeting their aspirations and the Minister of Agriculture has convened a meeting of the country's Ministers to reach an agreement about how best to move forward. The ALPS model will be used to test their proposals.

Interest Groups

Meeting attendees represent one of five special interest groups: **Water, Forest, Climate, Food Security, and Economic Growth**. Each interest group includes a Minister and several constituents. Each of these groups has a briefing sheet similar to the one to the right (Figure 2) which provides information about their interests and concerns as well as some data about the past and expected future. On the reverse of the page (Figure 3) is a list of the interventions that they may consider in an effort to achieve their goals.

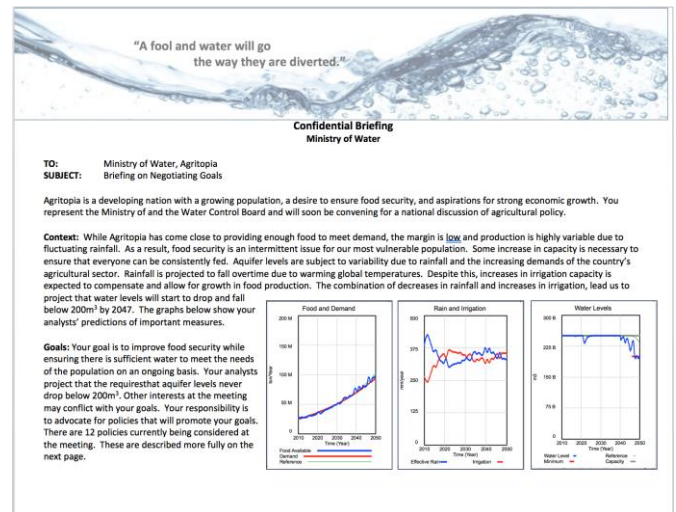


Figure 2: Interest Group Briefing Sheet (front)

Three interest groups are primarily concerned with **avoiding overuse of resources**:

Water: This interest group includes the Minister of Water as well Water Control Boards and the person responsible for Irrigation at the Agricultural Ministry. This group's primary concern is ensuring that there is sufficient water to meet the needs of the population on an ongoing basis.

Forest: This interest group includes the Forest Minister as well as representatives for wildlife and tourism, erosion programs, and land conservation groups. They are advocates for maintaining forests for future generations.

Climate: This interest group includes the Minister of Climate as well as the Ministry's climate team, climate advocacy organizations, and other environmental organizations. Their primary concern is maintaining emissions at a level consistent with the country's obligations to the Paris Climate Agreement.

The other two interest groups are primarily concerned with **growth in food supply to varying degrees and for different reasons:**

Food Security: This interest group includes the Minister of Health as well as religious organizations and Oxfam and others who seek to achieve United Nations Development goals to ensure adequate production of food per person to satisfy the nutritional needs of the population.

Economic Growth: This interest group includes the Minister of Agriculture as well as representatives from the Finance Ministry, industry advocates, and the Chamber of Commerce. Their primary interest is in the growth of the national economy. They desire to increase production to maximize profit and export income for the nation.

Participants will be in their interest group teams throughout the exercise. One person from each group will be assigned as the Minister and will speak for the group.

POLICY LEVER	LEVER SETTING	Current	+10	DESCRIPTION
Crop Land Growth	0%	3%	6%	Annual rate of expansion of land for growing crops, currently at 3% per year. There is potential to increase the cropland conversion rate of forests to cropland to as high as 6% or reduce it to as low as a total moratorium. Converting land to farm use requires clearing of forests and typically requires burning which contributes to greenhouse gas emissions.
Marginal Land Return	n/a	0%	15%	Percent of crop land that is abandoned and allowed to convert back to forest. 15% of crop land is marginal and ripe for abandonment. Because the land is lower yield, abandonment lead to a 5% increase in the average yield on the remaining crop land.
Livestock Growth	0%	3%	6%	Annual rate of growth in livestock, currently 3% per year. Livestock growth can be increased to as high as 6% or reduced to as low as a full halt. Livestock is raised primarily for status rather than food. While livestock do not require additional land, they do require more resources than crops and result in higher greenhouse gas emissions due to the cows' biological methane emissions.
Fertilizer Growth	0%	3%	6%	Annual rate of growth in fertilizer use per hectare, currently 3% a year. You can increase the fertilizer growth rate to up to 6% or place limitations on its use that reduce the growth rate to as low as 0%. While use of fertilizer increases crop yield, it creates N ₂ O which is a greenhouse gas.
Crop Yield Improvement	n/a	0%	25%	Increase in productivity per hectare from crops through means other than irrigation and fertilizer, like technology and practices (i.e., new seeds). There is potential to dramatically improve base crop yield and input effectiveness by up to 25%.
Livestock Yield Improvement	n/a	0%	25%	Annual increase in the food produced per head of livestock. There is potential to dramatically improve livestock yield by up to 25% through new technology and practices including new breeds, better livestock health, and better milk and egg practices.
Reservoir Expansion	n/a	0%	25%	Building of dams to expand water reservoirs. There is the potential to expand reservoir capacity by up to 25%, thereby increasing the availability of water for farming and other purposes.
Irrigation Expansion	n/a	0%	25%	Installation of irrigation systems to provide water to croplands. There is the potential to expand irrigation by up to 25%, thereby increasing the likelihood of successful harvest of croplands.
Irrigation Improvement	n/a	0%	50%	Improvements in technology and practices (i.e. drip irrigation) that result in more efficient water use for agricultural purposes. There is potential to facilitate adoption of best practices by up to 50% more farmers.
Export Crop Expansion	n/a	0%	10%	Shifting from traditional crops to those that have a higher value (i.e. tomatoes), usually through export to other countries. The value of crops can be increased by up to 10% by shifting a portion of production to higher value crops. These crops tend to require more water than traditional crops.
Greenhouse Gas Reduction	n/a	0%	25%	Reduction in greenhouse gas emissions (i.e. methane and nitrogen) that are produced by agricultural activities. Policies to encourage sound manure management and nitrogen runoff reduction can reduce greenhouse gas emissions from crops and livestock by up to 25%.
Food Waste Reduction	n/a	0%	20%	Percent reduction in food waste as it moves from the farm and the consumer. Policies to improve transportation, storage, and markets can reduce post-harvest losses by up to 20%.

Figure 3: Intervention Descriptions

Participants

A minimum of five participants, one for each interest group, is required to play the game. Ideally there would be at least 10 participants, so that each interest group has two members. Any number of participants may be accommodated, but if in excess of 25, you might consider breaking into two countries so that teams have no more than 5 people.

Participants should be evenly distributed across the interest groups. As you assign individuals to positions, we recommend that you be thoughtful about assigning people to groups based upon either their actual societal role (as a way to explore how one might actually shift the stances of people who hold them), or something outside of their normal boundaries (to help participants understand alternative perspectives).

Facilitators

Two facilitators are ideal, though it can be done with one. Generally, we recommend that the following roles be defined for facilitators.

- Facilitator #1:
 - Setup experience,
 - Record results on the Strategy Summary Board,
 - Run the ALPS simulator, and
 - Lead overall debrief.
- Facilitator #2:
 - Act as Prime Minister to run the experience,
 - Maintain a formal tone encouraging people to take their roles seriously and work towards a meaningful proposal,
 - Records results on board,
 - Drive exercise towards an agreement in allotted time, using gavel and a firm tone to move things along, and
 - Supports the overall debrief.

Setup

- Prepare facilitator costume to represent the Prime Minister – this might include the following: a suit, tie, glasses, hairstyle change, and gavel.

- Setup five round tables and chairs sufficient to accommodate the number of participants. Each table will represent one interest group.
- The following materials should be placed on each table (Figure 4):
 - OPTIONAL Table cloth color coordinated with their interest group (Ministry of Health = Orange, Ministry of Agriculture = Gold, Ministry of Climate = Purple, Forest Ministry = Green, Water Ministry = Blue).
 - Set up tables from left to right according to the colors in the rainbow - Food Security, Economic Growth, Water, Forest, Climate. Debriefs will be completed from left to right (clockwise).
 - Table Tent
 - Name tags (one per table – for assigned Minister)
 - Dot Stickers color coordinated with their interest group (one per person)
 - Interest Group Briefing Sheet (one per person)
 - ALPS Strategy Proposal Worksheet (one per table)
 - Colored tokens (12 of one color) (There will be 60 tokens overall with one color for each interest group: orange, yellow, green, blue and purple)
- Setup one computer at front of room with a projector. (OPTIONAL: One computer at each table for interest group use.)
 - You will need internet access to load software, but once set up it is not required
 - [Install Vensim Reader](#) (version 8 or above) on each computer. From that link, select model reader and the appropriate operating system. You will be emailed instructions.
 - Save the ALPS model on your computer, and open it in Vensim Reader
- Place a large table at the front of the room – this could have a red tablecloth to complement other tables.



Figure 4: Interest Group Table Setup

- Place the Agritopia Game Board (Figure 5) on the table.
- OPTIONAL Some facilitators may like to dramatize the game using props. The following might be used:
 - Plastic or paper food
 - Empty container for water
 - Ladle
 - Pitcher of water (100% full)
 - Fake Money
 - Black rocks to signify coal
 - Paper or model trees

Agritopia Strategy Proposal

Reduce

Policy

Increase

Round

Notes
Place tokens to increase or reduce policy impact. Ten tokens for full impact. See handbook for policy definitions.

Figure 5: Agritopia Game Board

- Display the ALPS Strategy Summary Matrix (Figure 6) at the front of the room. Depending on circumstances, this can be either hand drawn on a white board or chalkboard, printed onto a poster, or projected on a screen (but only if results can be recorded simultaneously with displaying simulation results).

ALPS (Agriculture and Land Policy Simulator)

Strategy Summary

		LOBBYING EFFORT OUT OF 10		
		ROUND 1	ROUND 2	FINAL
OPTIONS	POLICY LEVER			
	Crop Land Growth			
	Marginal Land Return			
	Livestock Growth			
	Fertilizer Growth			
	Crop Yield Improvement			
	Livestock Yield Improvement			
	Reservoir Expansion			
	Irrigation Expansion			
	Irrigation Improvement			
	Export Crop Expansion			
	Greenhouse Gas Reduction			
	Food Waste Reduction			

Figure 6: ALPS Strategy Summary Matrix

- Display the ALPS Results Summary (Figure 7) at the front of the room. Depending on circumstances, this can be either hand drawn on a white board or chalkboard, printed onto a poster, or projected on a screen (but

only if results can be recorded simultaneously with displaying simulation results).

RESULTS

ROUND	Food	Economy	Yield	Water	Forest	Climate
1						
2						
FINAL						

●
Figure 7: ALPS Results Summary

Facilitation Process (1.5 hour experience)

Below is a description of the key components of the facilitation process.

Setup

- If two facilitators, first facilitator presents slides 1-12 to provide background on the Agritopia experience.
- While participants take 5 minutes to review their briefing materials, second facilitator leaves room to transform into Minister of Agriculture: suit, tie, glasses, new hairstyle, gavel.
- Interest groups will select Ministers who will put on a name tag and have primary responsibility for speaking for the group.

The Experience

- First facilitator welcomes the Ministers (Slides 13 and 14) and introduces the Prime Minister, who enters the room.
- The Prime Minister explains the current state of Agritopia (Slides 15 – 21).
- OPTIONAL If appropriate for the setting, the Prime Minister can dramatize the situation, using props:
 - Food – place 50% of food on table mentioning that there is just enough for everyone, but some go hungry
 - Water – pour half of the water into the container mentioning that we currently have enough water to meet needs, but that we expect droughts to increase due to a warming climate
 - Economic Growth – place half of the money on the table, congratulating Ministers for current economic growth, but stating that more is desired

- Forest – place half of the trees on the table, stating that we have solid forests in place, but they are at risk
 - Climate – place all of the coals (black rocks) on the table and say that we are far from meeting our obligations to the Paris Climate agreement.
- The Prime Minister invites the Ministers for each of the interest groups to make a statement.
- Each Minister steps up and makes the case for their primary interests as their slide (Slides 22-27) are put up.
- The Prime Minister states the purpose of today's meeting (Slide 28).

Caucus Proposals (Slide 29)

- Interest groups caucus to determine their favorite intervention.
- Each Minister makes a case for the favorite to convince the other Ministers.
- ALPS model is used to test interventions.

Round 1: Agricultural Policy Proposal (Slide 30)

- Interest Group Deliberations (Figure 8)
 - Participants meet in interest groups.
 - Clarify shared belief about the elements of a sound strategy that will achieve your interest groups goals.
 - Agree on a strategy and place their 12 tokens on game board to represent proposed strategy.
 - Optional: Explore the computer simulation to understand expected results.
- Negotiations (Figure 9)



Figure 8: Deliberations

- Interest groups review the commitments of tokens on the game board and negotiate across interest groups to achieve their goals.
- Each interest group may move their own tokens on the game board based upon this negotiation.
No interest group may move the tokens of another interest group.



Figure 9: Negotiations

- Negotiation Round Debrief
 - Prime Minister records results on the Strategy Summary Chart (Figure 4) as they are read off game board by Facilitator #1.
 - Facilitator #1 simulates and explains the results.
 - Make sure everyone is watching the screen and knows that:
 - grey line is a baseline
 - red line is a target (economic value, forests, crop yield, climate) or a line which you cannot go below (food security, water)
 - Make sure to slowly change the levers so that people can see what changes
 - Point out the metrics that have changed and whether it is good or bad.
 - Point out which interest groups have achieved or missed their targets.
 - OPTIONAL If using props, dramatize changes as follows:
 - Food Available
 - Slightly above target, all years: Congratulate and add remaining food
 - Below target: Remove food
 - Substantially above target: Add remaining food, but let them know they are producing far more than necessary
 - Water Levels
 - Above target in all years: Congratulate and pour water from pitcher into container
 - Fall below target: Remove water with ladle
 - Economic Value & Forest

- Meet target: Congratulate them and add all the money/trees
 - Improve, but don't meet target: Provide some more money/trees, but point out missed target
 - Fall below baseline: Remove some money/trees
- Crop Yield
 - Simply point out the result – there is no interest group for this metric, but it provides a clue as to a successful strategy.
- Climate Change
 - Meet target: Congratulate and remove all coal
 - Improve, but don't meet target: Remove some coal
- Display climate impact: to motivate the climate goal, compare results with and without climate feedback.
 - Facilitator should note that Agritopia by itself cannot cause or solve climate change problem, but that feedback represents “what-if” case of all countries meeting or missing the Paris Agreement Target by the same amount.
 - While watching graphs, move the Climate Scenario Switch to position “4”. Note decreases in water, yield, food available, and economic value. Decreases will be proportionally worse by the amount the climate target is missed.
 - You can also contrast results with the switch in position “2” – if there was no climate change.
- Prime Minister invites each Minister to:
 - react to the results, expressing their satisfaction or displeasure, and
 - make a case to modify the proposal.
- Record results on ALPS Results Summary (Figure 5).

Round 2: Agricultural Policy Proposal (Slide 31)

Round 2 is a repeat of Round 1. The primary difference is that during the debrief, you should pay special attention to whether results are an improvement from Round 1.

Overall Debrief

- Begin with a “Final Round” (Slide 32)
 - Each Minister gets to:
 - react to the results, expressing their satisfaction or displeasure, and
 - make a case to modify the proposal.
 - In this round, you will modify the proposal to reflect each Minister’s suggestions – if they are an improvement, keep the changes. If they make them worse, return them to the last state.
 - Record final results on the ALPS Results Summary.
- Roll Call Vote (Slide 33): Ask each Minister to vote on the Final Policy Proposal – the one currently on the screen.
- Overall Debrief (Slide 34): Open discussion. The following points are ideal to discuss:
 - Some interventions are “win-wins”: greenhouse gas and food waste reduction
 - There are many interdependencies and tradeoffs, so some interventions are contentious: crop land growth, fertilizer growth
 - While there are many solutions that produce winners and losers, it is possible for everyone to win.
 - Actions that oppose each other are counterproductive and it would be parties to work together beyond silos to find the “win-wins”
 - Growth maximization is not sustainable.
 - You can’t just efficiency yourself out of the problem.
 - Land use is a leverage point, you must use land more efficiently to achieve all goals.
 - Growing agricultural sector to improve economy, this is going to cause trouble with water and emissions. Are there other ways to grow?

There are also back up materials available if participants request additional information.

The ALPS Model

The ALPS Model was developed using Vensim, a System Dynamics Modeling software program. Below (Figure 10) is a very simplified version of the stock and flow diagram.

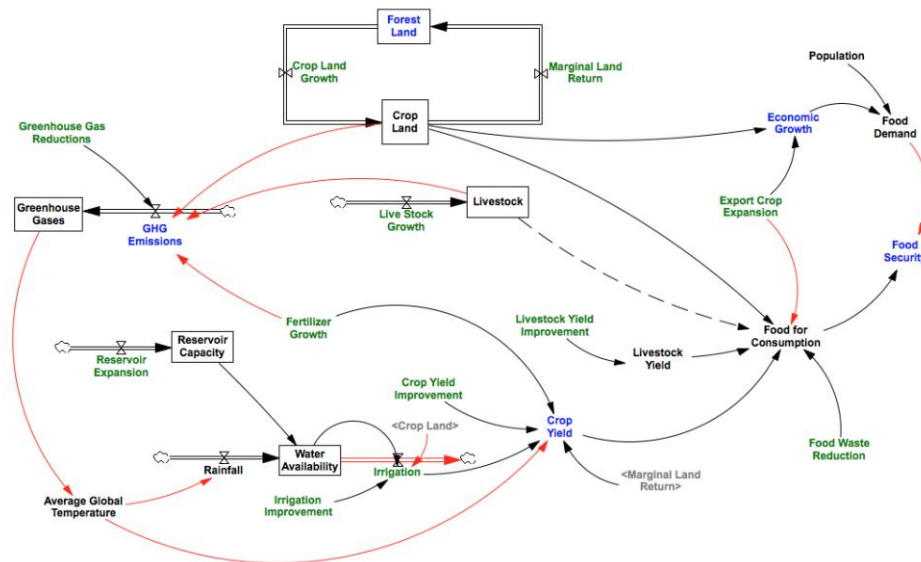


Figure 10: Simplified stock and flow structure of the ALPS model.

There are many equations in the model. A few of the most important are outlined below (Figure 11).

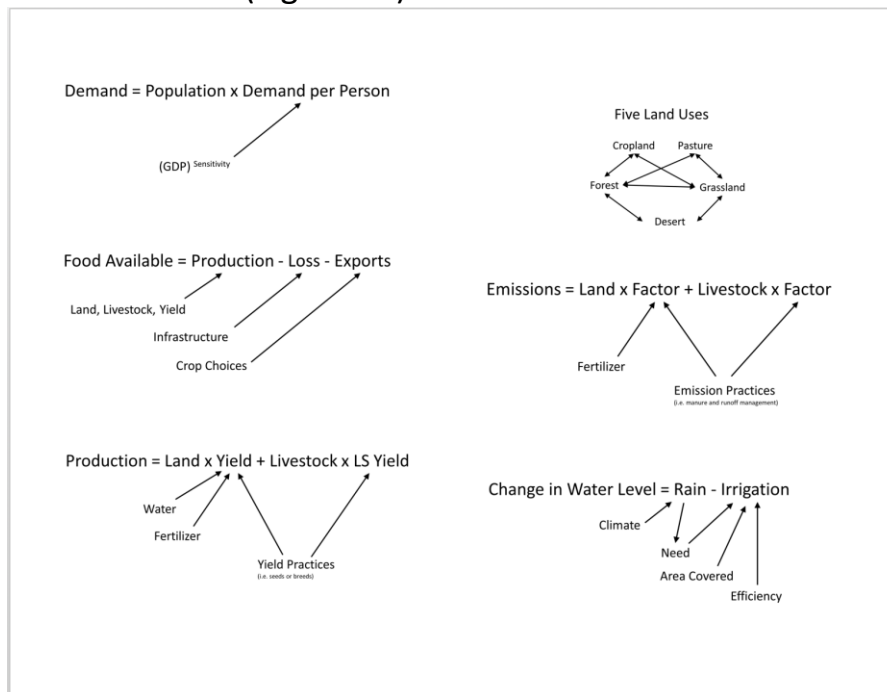


Figure 11: Useful ALPS equations.

A summary of the effectiveness of each intervention on each of the primary output dimensions is below (Figure 12).

CHANGE FROM BASELINE (2050 or Cumulative)

INPUTS	OUTPUTS					
	Water	Forest	Emissions	Crop Yield	Food Security	Economic Growth
BASELINE	199.3	6.029	3189	4326	1565	2.39
Crop Land Growth (+/-)	-12.9	-3.229	826	-421	286	0.522
Marginal Land Return	10.7	1.712	-248	501	-57	-0.083
Livestock Growth (+/-)	0	0	323	0	146	0.133
Crop Yield Growth	0	0	0	1654	553	0.661
Fertilizer Growth (+/-)	0	0	530	1194	400	0.307
Livestock Yield Growth	0	0	0	0	33	0.056
Reservoir Expansion	60.6	0	0	90	30	0
Irrigation Expansion	-33.6	0	0	165	55	0.195
Irrigation Improvement	33.2	0	0	90	30	0
Export Crop Expansion	0	0	0	0	-300	0.338
Greenhouse Gas Reduction	0	0	-358	0	0	0
Food Waste Reduction	0	0	0	0	346	0

Figure 12: Intervention effectiveness chart.