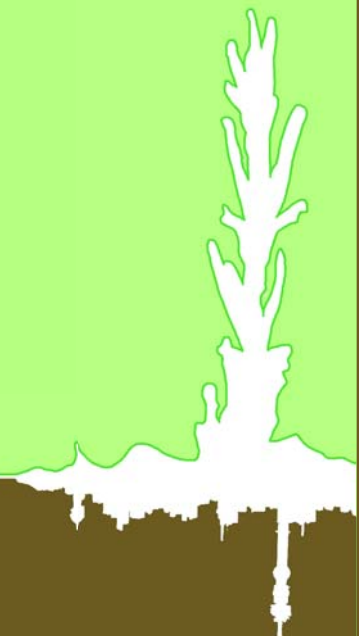


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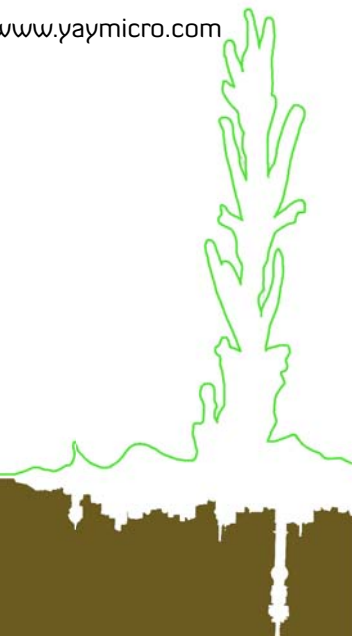
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Appendix A – Biomimicry Discovery and Comparison Chart

	Fig wasp and fig tree	Horn acacia and acacia ant	Termites
Energy	The fig tree photosynthesises, producing sugar out of water and light, which then makes the tree grow and provides food for the wasp offspring.	The acacia tree photosynthesises, producing sugar out of water and light, which then makes the tree grow and provides food for the ants.	The termite mound stays at a constant temperature inside, regardless of the external temperature fluctuations and extremes.
Water			By importing coarse particles into the soil it allows for the water to flow through the soil better, which retains water in the soil and enriches it.
Structure/Form	An edible house for the wasps in the form of fruit	A hollow bulbous base to certain thorns on the tree.	Termite mounds are made from soil shaped in mounds, often leaning north, and glued together with termite saliva. There is a labyrinth of passages and vents in the mound.
Social	In exchange for the pollination service provided by the wasp, the fig fruit provides room and board for the wasp's developing young. The fig trees "punish" the wasps for failure to pollinate by dropping unpollinated fruit, killing the wasp's offspring inside.	The bull horn acacia provides nutrients and housing for acacia ants in return for protection from herbivores.	Termites encourage social enhancement through regenerating the soil which allows for plants to grow again. These new plants attract animals and insects which then begin to perform their respective tasks in the ecosystem.
Soil			The termites repair barren landscapes with mounds spaced fairly equally, and the mounds act as nutrient restorers for the soil. It is suspected that termites import large particles into the otherwise fine soil in the vicinity of their mounds. These coarser particles promote water infiltration of the soil and discourage shrinking or swelling of the topsoil in response to precipitation or drought. The mounds also show elevated levels of nitrogen and phosphorus. Once the soil is fertile plants and trees can come in and grow. Often they will grow near to or over the termite mounds, where the soil is more fertile.

Fibonacci Series	Hollow cylindrical tubes	Bird feathers	Forest/tree
Plants shaped like the Fibonacci spiral are able to give access to sunlight to all leaves/petals for energy and photosynthesis.		Bird feathers are lightweight, allowing for reduced energy consumption when moving the feathers.	The main forces that affect their adapting to the location are light and gravity. Leaves photosynthesize when light hits them, turning water and carbon dioxide into energy to grow. They need sunlight to survive. Trees adjust the direction of their branches according to light, gravity and wind. The stems of trees bend when the illumination conditions have been altered so that they place themselves in new positions with respect to light, even in the confines of trees in a forest competing for light. The food-forming leaves must be arranged so that they do not compete among themselves for the enjoyment of light. This, at its basic level, is acting on a feedback loop.
Plants shaped like the Fibonacci spiral allow for efficient flow of water to every part of the plant.	Hollow cylindrical tubes allow for water or liquids to be transferred through them.	The feathers are fairly water tight, keeping the skin of the bird dry. This is achieved through many feathers overlapping, creating layers and sealing air in pockets.	Trees draw up water from the soil through the tips of their roots. The water is moved up through the wood and branches, then out to the leaves where it is used for photosynthesis. Some of the water transpires through the leaves into the air as water vapour. The roots filter the water, helping to clean it. The leaves help to break the fall of rain so that it does not cause erosion of the soil.
The Fibonacci arrangement allows for optimal space use. It works on a modular system which is based on differing scales of the same ratio. This is a continual repetition found in many examples of nature.	Hollow cylindrical tubes, as demonstrated in bamboo stems, vertebrae long bones, insect, spider and crustacean appendages, and feather shafts of birds, give high flexural and torsional stiffness with minimal material use. They are lightweight structures but do not compromise on strength.	A central shaft carries on either side a hundred or so filaments; each filament is similarly fringed with about a hundred smaller filaments or barbules. Barbules overlap those of neighbouring filaments and hook them onto one another so that they are united into a continuous vane. There are several hundred such hooks on a single barbule, a million or so in a single feather; and a bird the size of a swan has about twenty-five thousand feathers.	Trees are made from wood, which is a fibrous material of great tensile strength. As a result they are able to twist and bend in many different directions without falling. The roots stick into the ground, anchoring the tree against heavy winds and gravity. The branches are arranged so that each leaf can have access to sunlight.
			What came up about the overall structure of the forest are the gradients and hierarchies in a forest ecosystem in terms of the plant succession and scales. It starts with grasses and legumes, and then moves to perennial shrubs, then up to larger trees. A forest ecosystem is more than just plants though – it is a terrestrial unit of living organisms (plants, animals and microorganisms), all interacting among themselves and with the environment (soil, climate, water and light) in which they live. The environmental "common denominator" of that forest ecological community is a tree, who most faithfully obeys the ecological cycles of energy, water, carbon and nutrients.
			Trees root themselves in soil. They draw the nutrients from the soil to grow, they clean the soil, they hold the soil and prevent erosion, and the leaves of the tree add to forest litter which is an essential ingredient in maintain soil health. Forest litter comprises fallen leaves, moss, and other lowly ground vegetation, and is indispensable for the maintenance of the forest. The trees and forest litter are important for groundwater hydrology. They help to regulate local evaporation and rainfall patterns. The trees store large amounts of water. On decay of the forest litter it gives back to the soil the greater part of the store of nutrients, especially nitrogen. It protects the soil from consolidation and drying out, nourishes the micro flora and fauna, and increases soil fertility.

Appendix B – Table of a healthy Diet (Source: Bonti-Ankomah, 2001)

Table 2: A Healthy Diet and Expenditure per day

Food Item	Unit (gm)	Price/gm (Cents)	Total Cost (Rands)
Cereals & Cereal Products:			
Bread (2 slices)	60	0.372	0.223
Cooked Rice	125	0.398	0.498
Cooked mealies	70	0.25	0.175
Vegetables:			
Potato	120	0.199	0.238
Cabbage	20	0.186	0.037
Pumpkin	40	0.263	0.105
Carrot	20	0.327	0.065
Fruit:			
1 small orange	120	0.343	0.412
Orange Juice	200	0.500	1.000
Milk and Milk Products:			
Fresh milk	300	0.336	1.008
Yoghurt	200	1.651	3.302
Meat and Meat Products:			
Poultry	45	1.402	0.631
Beef	45	2.249	1.012
Egg	22.5	0.968	0.218
Legumes:			
White Beans	60	0.753	0.452
Fat and Oil:			
Cooking Oil	10	0.641	0.064
Margarine	10	1.050	0.105
TOTAL			9.55