Work with Nature, not against Her
-- "人定勝天" 不如 "人定順天" --

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As a highly evolved creature, we human beings are proud of our indomitable spirit. Indeed, such spirit is at the root of our accomplishments, ranging from the continual efforts against abuse in human and civil rights, fights against hunger and diseases, to exploration of space and the oceans. At the same time, we sometimes forget to step back and ask the all important question: What are the best ways to achieve our objectives? In dealing with politics or socioeconomic problems, one must work with human nature. Likewise, in seeking effective solutions concerning natural disasters, prudent use of limited resources, and protection of the environment, one must work with the laws of Nature – the domain of science – to achieve the best results. "Humankind shall conquer nature" ("人定勝天") touches an emotional chord and makes an excellent slogan, but is the direct, brute force approach always the prudent one?

Just consider the following: Power consumption by the world's entire population is roughly 15 terawatts (15×10^{12} or 15,000 billion watts; think about lighting 1,500 billion compact fluorescent bulbs). Meanwhile, the Earth receives about 170 petawatts (1.7×10^{17} or 0.17 billion-billion watts) of solar radiation in it supper atmosphere, or 11,000 times the rate of our energy consumption. Meanwhile, the Sun produces about 380 yottawatts (3.8×10^{26} watts, two billion times the radiation that researches the Earth's atmosphere), and there are approximately 0.01 to 1 yotta stars in the known universe, each producing power comparable to our Sun. It is truly remarkable that humankind can achieve so much considering how powerless we are! If we are, in fact, so intelligent, wouldn't it be most effective to always follow the laws of Nature such that we work along with her, instead of insisting that she must follow our ways?

What about engineering? Have we not achieved much that seemed impossible not so long ago? Machines heavier than air can fly, organ transplants are common place, cell phones are everywhere, and the list goes on. The fact is that all engineering devices apply known laws of Nature – be they from physics, biology, geology or chemistry. In addition, there is always a price to pay, including costs of materials and energy, human capital, and time. Last but not the least, every engineering feat has limitations which are set by Nature. One limit is capacity. Even with a comfortable margin for safety, no structure can support more load than its maximum capacity. Another limit is life-span. Even lifeless materials all fail eventually. For instance, most private residences in the United Sates have a life expectancy of about 30 years. But don't most houses last much longer? True, but only because of our continual investment in them, including constant maintenance and upkeep, and occasional upgrades and replacements. Nothing lasts forever and there is no such thing as an unsinkable ship.

First case in point is the recent (on April 25, 2010), massive landslide which buried several people alive in vehicles traveling on a major freeway in northern Taiwan. This

event is unusual in that there was no apparent trigger, such as heavy rain or seismic shaking. It is elementary knowledge that excavating a dip-slope (順向坡) is going against gravity, thus bearing an inherent risk of mass-movement (such as a landslide) which is almost naught below an escarpment (逆向坡). Indeed, in this case where land is very limited, there may not be any alternative but to excavate a dip-slope, so massive (and costly) countermeasures were engineered.

Regardless of whether there was a flaw in the design or construction of these measures, instability – crash of computers, massive cardiac attacks, onset of earthquakes, and in this case, sudden, unexpected failure of engineering remediation – is a common but poorly understood phenomenon. Until we have a better understanding of instability, which may be quite different from case to case, one cannot solve these types of problems once and for all. So what do we do? The choice is limited if we go against gravity, one of four known fundamental forces of Nature. If avoidance is not an option, then the safety factor of any engineering remediation must be expanded, with increased cost, of course. The cost will be borne by the public, either in the form of tolls or taxes. There is simply no free lunch.

Second case in point is the issue of global warming. In many circles, the view is that we must push the panic button now to counteract its effects, as any debate on the issue is considered politically incorrect. Recently, unanimity forced by politics has back fired, as unethical scientific conducts such as sloppy methodology and omission of contradicting evidence seem to have taken place in "proving" global warming. For instance, there is now a debate as to whether there is a reversal of warming in the last decade. Does this mean global warming is wrong? Probably not, as the Earth has been warming for about 20,000 years, since the last glacier age, long before industrialization took place. Intriguingly, on a geological time-scale, the Earth has experienced tremendous warming in the past. For instance, during the so-called Paleocene–Eocene thermal maximum, which occurred about 55 million years ago, the average global temperature rose by 5 to 9 degrees Celsius in several thousand years. Then the Earth mysteriously recovered from her fever, all without human intervention, of course. Would not a good understanding of this "miraculous" process of cooling greatly aid our cause in counteracting potential warming?

I do not advocate simply "wait and see", doing nothing in the mean time. But forging ahead without introspection can be wasteful at best and downright short-sighted and risky at worst. Surely ineffective countermeasures will miss the target and also take precious resources and time away from other important and urgent problems such as the potential shortage in water resources. Human beings can all use a boost in confidence when times are difficult or uncertain, but being over-confident leads no where except self-aggrandizing or even a wrong direction of action. The message here is simple: Work smart, by using known scientific principles, with Nature ("順天"); not work hard, by working against her ("勝天").

For the UN/NGO Association of World Citizens