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The pdf file for the synopsis is posted at [http://www.rit.edu/~twwsma/Synopsis\\_planB.pdf](http://www.rit.edu/~twwsma/Synopsis_planB.pdf) .

I have now located a briefer synopsis of the previous edition of this book. It is at [http://www.mcgoodwin.net/pages/otherbooks/lrb\\_planb.html](http://www.mcgoodwin.net/pages/otherbooks/lrb_planb.html)  
This summary was written by Michael McGoodwin in 2005 and emphasizes some of the same things but is quite different and also worthwhile.

### **Notes on “Plan B 2.0”, Rescuing a Planet Under Stress and a Civilization in Trouble” by Lester R. Brown**

The title tells the story of the book quite well. The book starts with a description of why we should be alarmed about the state of the world, then goes on to put price tags on the repairs which are necessary. Finally he claims that we can save the civilization if we get together, act fast, and (properly) invest 1/6<sup>th</sup> of the world’s defense budget on the necessary measures. He doesn’t dwell too much on the difficulty of getting politicians and corporate managers to deal with long-term issues even when this long term is measured in time frames like 10 to 20 years.

#### **I A Civilization in Trouble**

**I.** The first part has chapter titles: Beyond the oil peak; Emerging Water Shortages; Rising Temperatures and Rising Seas; Natural Systems Under stress; and Early Signs of Decline. The presentation has a sizable bibliography, which serves to give the reader details and sources for many ideas and facts with which he/she may or may not already be acquainted. I will only make notes of some ideas which were new to me or which seemed particularly interesting in the way they were presented.

For example, after the oil peak “the food sector will be affected in two ways.” “Food will become more costly as higher oil prices drive up production costs.” ... “At the same time, rising oil prices will also be drawing agricultural resources into the production of fuel crops, either ethanol or biodiesel.” He remarks elsewhere that this will put the affluent auto users in direct competition with food needs of the poor of the under developed countries. This is, of course, a recipe for a great deal of stress and pain.

The story of Lake Chad is a particularly poignant example of emerging water shortages. “Africa’s Lake Chad, once a landmark for astronauts circling the earth, is now difficult for them to locate. Surrounded by Chad, Niger, and Nigeria – three countries with some

of the world's fastest-growing populations – the lake has shrunk by 95 percent since the 1960's" due to strong demands for irrigation water. Water vs. food: we drink about 4 liters of water per day in one form or another, however the water needed to produce our daily food is about 2,000 liters or about 500 times as much. This helps explain why 70% of all water is used for irrigation with 20% for industry and the remaining 10% for residential purposes. This has led to falling water tables in many of world's replenishable and non-replenishable (fossil) aquifers. Some countries including China, India and the (especially southern Great Plains in the) United States are seriously overpumping their aquifers and this is a very serious threat to their grain production. In the U.S. the threat is limited because only 37% of all irrigation water comes from deep underground. However Texas, Kansas and Nebraska each get 70-90% of their irrigation water from the Ogallala aquifer, which is essentially a fossil aquifer with little recharge. In parts of Texas, Oklahoma, and Kansas the underground water table has dropped by more than 30 meters causing wells to run dry on thousands of farms in the region. It is easy to imagine the resulting catastrophic social and agrarian effects there.

Climate change is the source of much of the world's problems (but certainly not all!). "Higher temperatures diminish crop yields, melt the snow/ice reservoirs in the mountains that feed the earth's rivers, cause more destructive storms, increase the areas affected by drought, and cause more frequent and destructive wild fires." A couple of notes: The area in the Swiss Alps which is covered by glaciers shrank by 1% in the 12 years after 1973 and by another 18% in the next 15 years from 1985 to 2000! Kilimanjaro, Africa's tallest mountain, lost 33% of its ice field between 1989 and 2000 and is projected to lose its whole snowcap by 2015! (Again, these snowcaps feed the rivers, which give us water for food, etc.) Melting of glaciers at the poles leads to rising water levels in the oceans. Indeed the International Panel on Climate Change has estimated that sea level will rise between 9 and 88 cm (4 to 35 inches) in this century and recent studies indicate that rate of melting of the earth's ice cover is increasing. Much very fertile land and great concentrations of population are essentially at sea level. This is most obvious in Bangladesh and the Netherlands and it is no surprise that rising seas are a very serious threat to all of us

There is a section on deteriorating rangelands. Brown points out that 10% of the world's surface area is used for cropland while 20% of more marginal land is used for rangeland. This rangeland becomes severely endangered when overgrazing occurs as cattle, sheep, and goats trample this marginal land and further reduce its productivity and then the wind does the rest, removing the soil and converting productive rangeland into desert. China has more cattle than the US and almost 50 times as many sheep and goats and the desertification problem is particularly severe there. "Large-scale desertification is concentrated in Asia and Africa – two regions that together contain nearly 4.8 billion of the world's 6.5 billion people." In a period when Nigeria's population quadrupled, its livestock population multiplied 11-fold. The northern part of the country is slowly turning into desert. "China is being affected by desertification more than any other major country." Since 1950 the area being lost to desert has increased from an average to 1,560 to 3,600 square kilometers annually. Social consequences: In China's dust bowl provinces the abandonment or partial depopulation of 24,000 villages is displacing tens

of millions of people. In Latin America, especially in Brazil and Mexico desertification is causing huge financial and social upheavals. For example, some 700,000 Mexicans are forced to leave the degraded cropland each year in search of jobs in nearby cities or in the U.S.

Collapsing fisheries are causing similar stress and reductions in plant and animal diversity do not bode well for the future. I will continue to follow the flow of the text as it is convenient although, while reading, I often had to stop to digest the frightening information of the first portion of the book and then had to skip some of it entirely until I had given myself strength by reading some of the more positive parts of the book.

Life span in the world is sharply divided with “a low of 33 in Swaziland and 37 in Botswana to a high of 82 in Japan and 81 in Iceland”. Incidentally, in the US the “life expectancy of 77 years now lags behind the 78 years of Costa Rica, a developing country”, which is probably due to having some 24 million Americans without health insurance. The world has many great contrasts: the poorest billion people trapped at a subsistence level and richest billion becoming wealthier with each passing year. Or: roughly 1.2 billion people are undernourished, underweight, and often hungry while another 1.2 billion people are over-nourished and overweight, most suffering from excessive caloric intake and exercise deprivation. Illiteracy is concentrated in a handful of the more populous countries, mostly in Asia and Africa. Illiteracy and poverty tend to reinforce each other as, for example, in Brazil illiterate women have an average of over six children while literate women have only two children on average. (Such data are useful later when Brown is looking for solutions to our problems since reducing illiteracy increases wealth and reduces population growth rates at the same time. “win-win-win”) The (two way) links between poverty and sickness are not at all surprising and it is probable that improvements to health bring manifold improvements to mankind’s circumstances.

The last two sections of the first part of the book are entitled “Environmental Refugees on the Rise” and “Failed States and Terrorism”. Although also important, I now choose to go on to part II of the book “The Response – Plan B”.

## **II. The Response – Plan B.**

The chapter titles of the second part are: Eradicating Poverty, Stabilizing Population; Restoring the Earth; Feeding Seven Billion Well; Stabilizing Climate; and Designing Sustainable Cities. Again I will only touch on pieces of the puzzle, which are new to me or are particularly interesting. Brown spends quite a bit of space doing a cost analysis of the needed changes. To make the length of my presentation manageable, I will leave this out most of the time. In the third part he collects the total costs, etc.

Above I mentioned the benefits of basic education and the United Nations has set universal primary education by 2015 as one of its Millennium Development Goals. Other goals are: cutting both poverty and hunger in half by 2015. Brown notes that “few incentives to get children in school are as effective as a school lunch program, especially in the poorest countries”. This also helps the learning ability of the children as well as

reducing their frequency of sickness and such a program would only cost an estimated \$6 billion per year beyond what the UN is now spending in its efforts to reduce hunger. The reduction of poverty is going more or less on schedule due to economic growth in China and India. However, “the bad news is that sub-Saharan Africa – with 750 million people – is sliding deeper into poverty. Hunger, illiteracy, and disease are (also) on the march, offsetting some of the gains in China and India”.

**Stabilizing population.** “Some 42 countries now have populations that are either essentially stable or declining slowly. ... A larger group of countries has reduced fertility to the replacement level or just below. ... A third group of countries is projected to more than double their populations by 2050 including Ethiopia, the Congo, and the Sudan.” There are various projections for maximum world population: 9.1 billion or 10.6 billion by 2050 or, with a rapid move to below replacement-level fertility of 1.6 children per couple, would bring a peak population of 7.8 billion by 2041. The benefits of universal access to family planning are enormous and the costs are minimal. (Brown doesn’t mention here the enormous opposition to family planning services by the U.S. government, by the Roman Catholic Church, and by fundamentalist religious sects.) There are, however, also some good stories. For example, since 1989 Iran has (again) had a thorough and extremely effective family planning program.

Further sections in this chapter are: Better Health for All; Curbing the HIV Epidemic; Reducing Farm Subsidies and Debt; and A Poverty-Eradication Budget. Each of these sections offers a fair amount of good news and lots of work to be done.

**Restoring the Earth.** The lead paragraph is: “The health of an economy cannot be separated from that of its natural support systems. More than half of the world’s people depend directly on croplands, rangelands, forests, and fisheries for their livelihoods. Many more depend on forest product industries, leather goods industries, cotton and woolen textile industries, and food processing industries for their jobs.” It is obvious that a healthy environment is necessary in order to deal with poverty and other social problems not to mention the climate change problems.

The sections in this chapter are: Protecting and Restoring Forests; Conserving and Rebuilding Soils; Meeting Nature’s Water Needs; Regenerating Fisheries; Protecting Plant and Animal Diversity; and The Earth Restoration Budget.

Brown shows that many present steps need to be intensified and made more widespread to deal with the problems. For example, since wood as fuel accounts for half of all wood usage, the “solar cooker” project in Kenya needs to be expanded. These cookers, costing \$10 each, use almost no fuel and slowly cook food slowly like a crock-pot in three hours of sunshine. They can also be used to pasteurize water. The notion of sustainable forestry needs to be expanded to sustain forests not only for forest products but also forest services such as flood control and projects to stabilize soils and climates. China is planting a belt of trees to protect land from the expanding Gobi Desert, “a green wall, a modern version of the Great Wall”. There is a similar project in Africa to stop the expansion of the Sahara.

There have been great successes through the creation of marine reserves. Indeed, A statement signed by leading marine scientists claims: “All around the world there are different experiences, but the basic message is the same: marine reserves work, and they work fast. It is no longer a question of *whether* to set aside fully protected areas in the ocean, but *where* to establish them.” (My aside – the environmentalists have recently even convinced George W. Bush to agree to a huge reserve in Hawaii.) While great, the costs of managing a network of marine reserves governing 30% of the oceans would be substantially less than the subsidies governments now pay to fishers. The total “annual earth restoration budget” is huge but, as we will see in the last chapter, manageable.

**Feeding Seven Billion Well.** One of the huge problems is that so many people want to consume more livestock products and these are wasteful of water and our soil resources. In any case, there is a great need to increase land productivity and great problems in doing it. One method is to do double cropping (where soil moisture permits). In the U.S. planting winter wheat followed by soybeans is a doubling method, which also reduces the need for fertilizer due to the fixing of nitrogen from the soybeans. In northern China and India wheat and rice can be double cropped.

In many lands additional fertilizer doesn't help but it would help in sub-Saharan Africa. However, there the infrastructure is often insufficient to transport fertilizer economically to the villages where it is needed. A masterful solution to the problem is to plant grain and leguminous trees simultaneously. The trees start to grow slowly permitting the grain to mature, then the trees develop more rapidly and drop leaves that provide nitrogen and organic matter. Then the wood is cut and used for fuel. In Nairobi, farmers have been able to double grain yields in a matter of a few years using this idea!

The problem of raising water productivity is also major as it takes a ton of irrigation water to produce 1 kg of grain! “Raising irrigation water efficiency typically means shifting from the less efficient flood or furrow system to overhead sprinklers or to drip irrigation”, the most efficient method. Drip irrigation tends to be labor intensive but labor is a commodity in good supply in many dry lands.

A related issue is that of increasing efficiency of protein production. “With cattle in feedlots, it takes roughly 7 kg of grain to produce a 1 kg gain in live weight. For pork, the figure is close to 4 kg of grain per kg of weight gain, for poultry and herbivorous species of farmed fish, it is less than 2kg.” Thus changing diets to more poultry and fish and less livestock can provide a major improvement in efficiency. China has been particularly successful in changing to fish production. India has been very successful in increasing milk production based “almost entirely on roughage – wheat straw, rice straw, corn stalks, and grass collected from the roadside.”

The question: “How many people can the earth support?” - - has response “At what level of food consumption?” In the U.S. the average consumption of grain (direct or indirect though meat, etc.) is 800 kg per person per year; in Italy it is 400 kg; and in India it is 200 kg. The corresponding possible populations are: 2.5 billion people; 5 billion people; and

10 billion people. Since the most optimistic estimate of peak population is 7.8 billion by 2042 and much higher numbers are very likely, it is clear that the American diet cannot be maintained and made universal! Some of the possible changes are mentioned in the previous paragraph.

**Stabilizing Climate.** “In July 2005, the European Commission proposed a new plan to cut energy use 20% by 2020 and to increase the renewable share of Europe’s energy supply to 12% by 2010.” This would cut carbon emissions by nearly one third and save 60 billion Euros by 2020. Japan also has a national campaign to boost energy efficiency in its economy. The details are inspiring and could be emulated in the U.S. There are suggested programs in Canada and the U.S., which could have huge results. Brown believes: “Cutting world carbon emissions in half by 2015 is entirely within range” and “is commensurate with the threat that climate change poses.” An important part of this would be to raise energy productivity with such measures as using energy efficient light bulbs, improving the fuel economy of automobiles and trucks (use of gas-electric hybrids, for example), and redesigning urban transport systems. Another important piece of the puzzle is a vastly increased use of wind power. Later he suggests that gas-electric hybrid cars should be equipped with an extra battery, which would be recharged at night using cheap electricity produced by wind power. Of course, photovoltaic electric generation also can be greatly expanded. Another source of energy, which is vast and not yet sufficiently in use, is geothermal energy. “The frugal use of land by wind is impressive. Within the U.S. a quarter-acre of land in the Corn Belt can be used to site an advanced-design wind turbine that will produce \$100,000 worth of electricity per year or it can be used to produce ... corn ... (for) ethanol ... worth perhaps \$200.”

### **Designing Sustainable Cities.**

... “It occurred to me that the ratio of parks to parking lots may be the best single indicator of the livability of a city – an indication of whether the city is designed for people or for cars.”

“The world’s cities are in trouble.” ... “The quality of daily life is deteriorating. Breathing air in some cities is equivalent to smoking two packs of cigarettes per day.” ... Frequently we have longer commutes in the U.S. with raising frustration levels.

Brown discusses the remarkable story Bogotá Columbia where the new mayor decided that the health of the city was measured by its quality for children and the elderly and in just a few years a modern urban transformation occurred. (Cf. p. 205)

The importance of dealing with cities is illustrated by some statistics Brown cites. For example, in 1900 only a few cities had over a million inhabitants but today 408 cities have that many and there are now 20 mega-cities with over 10 million inhabitants. Also “by 2007 more than half of us will live in cities – making us, for the first time, an urban species.”

Cities tend to be automobile centered and the idea that people, not automobiles need to be the focus of cities is gaining momentum. This is achieved by making cities more bicycle- or pedestrian-friendly (more parks, better public transportation, pedestrian areas, bicycle pathways) and by providing exercise and better air, which will improve the health of the residents as well. One way to keep cars out of the city is to charge cars for entering the city. For example, Singapore has imposed a tax on all roads leading into the city center; electronic sensors identify each car; and then debit the owner's credit card. In 2003 London adopted a congestion tax of 5 Pounds/car for vehicles entering the center city between 7AM and 6:30PM. That led to a 38% rise in the use of buses to travel into the central city. Other cities have considered this measure.

Farming in the city is also becoming much more common. "In Hanoi, 80 percent of the fresh vegetables come from farms in and immediately adjacent to the city." In Shanghai, in Caracas, Venezuela, in Singapore, in London, in Vancouver, Canada and elsewhere city farming is providing large quantities of produce and even large quantities of pork, poultry and fish for the populations. In the U.S. there is a huge unrealized potential for urban gardening – Chicago has 70,000 vacant lots and Philadelphia 31,000, for example. It has been observed that urban gardening has "a regenerative effect ... when vacant lots are transformed from eyesores – weedy, trash-ridden dangerous gathering places – into bountiful, beautiful, and safe gardens that feed people's bodies and souls."

In most cities water arrives and is used to disperse human and industrial wastes and leaves the cities dangerously polluted. "The time has come to manage waste without discharging it into the local environment, allowing water to be recycled indefinitely and reducing both urban and industrial demand dramatically." Dry composting toilets offer a healthy efficient alternative to the "flush and forget" system now in use worldwide, which in many areas just acts as a pathogen dispersal system.

The chapter continues to deal with the "Challenge of Urban Slums" and "Cities for People". All in all, the chapter "Designing Sustainable Cities" contains many good ideas and examples for the improvement of the human environment as well as ways to economize on scarce resources. In many areas of the world the migration from rural to urban areas is causing huge stress in the population and the present means of dealing with that stress are completely inadequate. These ideas provide many of the tools, which will be necessary to achieve peaceful change.

### **III An Exciting New Option**

**Building a new economy.** "In Chapter 1 we concluded that the western economic model – the fossil-fuel-based, automobile centered, throwaway economy – was not viable for the world. Instead, the new economy will be powered by renewable sources of energy, will have a more diverse transport system – relying more on rail, buses, and bicycles and less on cars – and will recycle materials comprehensively." Brown then goes on to describe this new economy in some detail making the point that it has to be done quickly enough to avoid economic decline and collapse. He makes the point that the key to doing this is the creation of an honest market, one that tells the ecological truth. Incidentally,

this is not a new idea. In the 1960's and 70's we used to talk about the need for the economy "to internalize the externalities". Then and now this means that packaging can't just go to the dump for free and we can't treat natural resources as infinitely available and the full costs of production – including depletion of resources, pollution, and recycling costs have to be reflected in the costs of the products. In Brown's words: presently the market "does not incorporate into prices the indirect costs of providing goods or services into prices, it does not value nature's services properly, and it does not respect the sustainable-yield thresholds of natural systems."

"The need for tax shifting – lowering income taxes while raising levies on environmentally destructive activities – in order to get the market to tell the truth has been widely endorsed by economists." For example, in Germany in 1999 a systematic shift of taxes from labor to energy was started and has led to accelerated growth in the renewable energy sector and created many new jobs in the wind and solar industries.

Brown gives several examples of products whose prices do not at all account for the real costs. For example, the Centers for Disease Control and Prevention in the U.S. has estimated the social costs of smoking cigarettes at \$7.18 per pack and the International Center for Technology Assessment has done a detailed analysis which claims the indirect costs (including oil industry tax breaks, oil supply protection costs, oil industry subsidies, and health care costs of treating auto exhaust-related respiratory illnesses) is about \$9 per gallon in addition to the, say, \$2.50 per gallon purchase price. Thus the real present value of gasoline is around \$11 to \$12 per gallon. Just think of the use changes, which would occur if that value were the actual out of pocket cost to the consumer! This is, of course, not going to happen too soon because the economy and the people are not prepared for such a change but we still may see huge increases in gasoline costs! In this regard Brown writes: "Some 2,500 economists, including eight Nobel Prize winners in economics, have endorsed the concept of tax shifts." Harvard economics professor N. Gregory Mankiw wrote in *Fortune* magazine: "Cutting income taxes while increasing gasoline taxes would lead to more rapid economic growth, less traffic congestion, safer roads, and reduced risk of global warming – all without jeopardizing long-term fiscal solvency. This may be the closest thing to a free lunch that economics has to offer."

Another example: Gold production is extremely harmful to the environment with its associated extensive release of mercury and cyanide and devastation of the open pit mining. A tax, which would cover the clean up costs and social costs of gold production, would raise its price several-fold.

Besides shifting taxes, there is the possibility of shifting subsidies. "Each year the world's taxpayers provide an estimated \$700 billion of subsidies for environmentally destructive activities, such as fossil fuel burning, overpumping aquifers, clear-cutting forests, and over-fishing." As an Earth Council study states: "there is something unbelievable about the world spending hundreds of billions of dollars annually to subsidize its own destruction." Brown provides several examples of subsidy shifting, which have been successfully tried.

“One industry whose value to society is being questioned by the environmental community is the bottled water industry.” At least in the industrialized countries drinking water controls are stricter than those for bottled water and, in general, boiling or filtering water would save the costs and waste of the bottles and of the distribution of them.

“The challenge in building an eco-economy materials sector is to ensure that the market is sending honest signals. In the words of Ernst von Weizsäcker, “The challenge is to get the market to tell the *ecological* truth.” To help the market to tell the truth, we need not only a carbon tax, but also a landfill tax so that those generating garbage pay the full cost of getting rid of it.”

The final sections are “New Industries, New Jobs” and “The Environmental Revolution”. Here the investment opportunities in the “New Economy” are discussed. The sooner the economic powers come to understand that the future lays in the “New Economy” the better.

### **Plan B: Building a New Future**

Two questions: “Is civilizational decline under way? And how can we tell?” “Among the early social signs of possible decline are a widespread drop in life expectancy, growing numbers of hungry people, and a lengthening list of failed and failing states.” After some discussion of these statements, he asks: “How many states have to fail before our global civilization fails?” (Examples of ways states can fail are: loss of the rule of law, failure to maintain infrastructure, extreme difference in income levels leading the great numbers of the very poor to try to overcome the small numbers of the very rich, etc.)

“We are entering a new world. Of that there can be little doubt. What we do not know is whether it will be a world of decline and collapse or a world of environmental restoration and economic progress. Can the world mobilize quickly enough? Where will the wake-up calls come from? What form will they take? Will we hear them?”

“In September 2005, scientists reported that the melting of ice in the Arctic may have reached a “tipping point”.” This would mean that we would see an increased rate of melting and heating. “If it becomes clear that we have set in motion a rise in sea that we cannot arrest or reverse, how will this affect the way we think about ourselves as individuals and as a society? Will we face a social fracturing between generations, between those who caused the rise in sea level and those who must deal with its consequences?” Brown goes on with more devastating questions and then writes: “this chapter is frustratingly difficult to write because it is not about what we need to do or how to do it, but rather about how to mobilize support to do it.”

“Facing many threats simultaneously means setting priorities. Terrorism is one of those threats. No question. But it is not even close to being the top threat facing our early twenty-first century civilization. Population growth, climate change, poverty, spreading water shortages, raising oil prices, and a potential rise in food prices that could lead to unprecedented political instability are the leading threats.”

I will now skip a lot and simply say that Brown looks for a “wartime mobilization” which would mean an investment equal to 1/6<sup>th</sup> of the world’s military budget and intelligent dedication of those resources to bring about a solution to the problems. And there is no time to be lost!

The rest of the chapter (and book) is a call to greatness with a quantified list of actions and expenses.

I hope, with this relatively short synopsis of “Plan B 2.0”, to have encouraged the reader to learn more, read more and to make his/her voice heard so that the political and economic powers will recognize the problems we are facing and that we all will get on the job of solving them. This is an immense task but we owe it to ourselves, our children and grandchildren and to future generations that we heed the wake-up call.

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To learn more about Lester Brown and/or the Earth Policy Institute, you may go to <http://www.earth-policy.org>