



## The Future of the Pacific and its Relevance for Geo-economic Interests

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### Abstract

*The Report forecasts that free trade initiatives in the Pacific will become polarized between the Trans-Pacific Partnership and the Regional Comprehensive Economic Partnership.*

*The Report identifies two factors that will slow Chinese economic growth and reduce U.S.-China bilateral trade in the next 30 years: the development of additive manufacturing and the increase of Chinese cost of labor.*

*In the next 30 years there will be a redistribution of global energy demand that will change the global political scenario: the discovery of large quantities of oil and natural gas in North America will reduce foreign energy demand in the United States and increase the availability of energy to cover Chinese demand. The short-term consequences will be reduction of competition between the US and China for sources of energy, increase of Chinese reliance on Middle Eastern and Latin American oil and growing Japanese imports of liquefied natural gas from the United States. This scenario will change when renewable energy will become more cost effective and will replace oil and natural gas as the main source of energy.*

*The Report laments that large nations and international organizations have been mostly concerned with security and trade in the Pacific while disregarding the protection of natural resources. It recommends massive restoration and anticipatory planning to make the resources sustainable. The Report finds that poor environmental conditions will affect the health of the population of Asian Pacific countries. It recommends mandatory vaccinations and stricter environmental protection laws to improve the health of the populations in the region.*

### 1. Legal and Political Issues

#### 1.1. The Development of Free Trade Agreements in the Pacific Region

Over the past decade, the center of world's economic growth has moved away from the Atlantic to the Pacific region. The development of international trade between America and

\* The biographies of co-authors can be found at [www.usacor.org](http://www.usacor.org)

Asia has made the countries in the Pacific region open their economic borders and create a free trade area in the region.

The first step has been the creation of APEC in 1986 (Asia-Pacific Economic Cooperation), which is a forum to promote free trade and economic cooperation in the Pacific region. When APEC was established in 1989, average trade barriers in the region stood at 16.9 percent, but had been reduced to 5.5% in 2004.<sup>1</sup> However, the Bogor Goals that called for complete trade liberalization by the year 2010 have not been achieved.

More recently, in 2005, the Trans-Pacific Strategic Economic Partnership was formed between Brunei, Chile, New Zealand and Singapore. In 2012, negotiations started to expand the TPSEP and create a Trans Pacific Partnership (TPP), a free trade agreement involving the members of the TPSEP, the United States, Australia, Canada, Peru, Malaysia, Mexico, Japan and Vietnam, which would eventually be the forerunner of a Free Trade Area of the Pacific (FTAAP).<sup>†</sup>

The US-sponsored TPP overlaps part of its membership with APEC and represents the beginning of a polarization of free trade initiatives in the Pacific between China and the USA. China's response to the TPP is the creation of the Regional Comprehensive Economic Partnership, which promotes free trade between China and its main trade partners.<sup>2</sup>

Many of these partners are members of the ASEAN bloc, the Association of South-East Asian Nations, which is planning to complete its import duty integration by 2015.<sup>3</sup> The RCEP would strategically benefit China and economically benefit ASEAN countries.

The first element that emerges by the historical analysis of free trade agreements in the Pacific is the fragmentation of trade liberalization among different organizations. These organizations work for the same goals but cover separate geographic areas.

Initially, the outcome will be a polarization of free trade among 2 areas: the US-sponsored TPP, which could merge with the Pacific Islands Forum, and the Chinese-sponsored Regional Comprehensive Economic Partnership with the ASEAN bloc.

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However, in the next 30 years, once the cost of labor becomes more uniform, these areas will eventually merge into one single Free Trade Area of the Asia-Pacific that will eliminate custom duties and guarantee equality of treatment among goods originating in different Pacific countries.

Free trade agreements can boost economic growth and prosperity but, if not supported by the guarantee of minimum wages, labor laws that protect worker and human rights, and a common environmental policy, they can cause an uneven wealth distribution with long term

<sup>†</sup> See [http://sice.oas.org/Trade/CHL\\_Asia\\_e/mainAgreement\\_e.pdf](http://sice.oas.org/Trade/CHL_Asia_e/mainAgreement_e.pdf)

adverse effects. It is our recommendation that free trade agreements in the Pacific be carefully planned to include these provisions.

### ***1.2. The Future of US-China Relations***

The new leadership within People's Republic of China (PRC), under the General Secretary Xi Jinping, seeks to continue economic growth and the limited domestic reforms that began under General Secretary Deng Xiaoping in the 1970s. Relations between China and the U.S. have remained stable since Xi assumed office, and he has continued the policies of his predecessor, Hu Jintao.

### ***1.3. Potential Game Changing Scenarios***

A major source of rivalry between the US and China is the demand for energy, in particular oil and natural gas. The economic growth of China, which started when the country entered the WTO and increased the manufacturing and export of consumer products, has dramatically increased the country's demand for energy. Since China is not a major oil and natural gas producer, it has turned to foreign countries to import energy. At the same time, the United States' demand for energy has also increased, as its national production has not been able to cover the internal demand. The result is an economic rivalry between the two world's largest economies, which is evident in different regions of the world, such as in the US support of South Sudan's independence as opposed to China's support of the government of Sudan, Chinese rapprochement with Brazil and Russia with the formation of the BRICS alliance, and Chinese opposition to sanctions on Iran in the United Nations.

One game changer will be the redistribution of global energy demand. Currently the United States is importing energy, in particular oil, from Saudi Arabia, Venezuela, Mexico and other countries in the Middle-East. The discovery of large quantities of oil and natural gas in different regions of the United States will reduce the foreign energy demand in the United States and increase the availability of energy for China, India and Japan. The short term consequence will be a reduction of the competition between the US and China for sources of energy and the increase of Chinese reliance on Middle Eastern and Latin American oil and natural gas. However, this scenario will change in the long term when renewable energy will become cost effective and replace oil as the main energy source.

Another important consideration is the trade balance between China and the United States. China has a net current account surplus in relation to the US and the rest of the world. The two elements of Chinese success in their export strategy are low labor costs and a devaluated currency. However, at least two factors may change this position in the short term:

- The development of additive manufacturing, a process of making a three-dimensional solid object of virtually any shape from a digital model. This process is conducted by machines and requires minimal human labor. The development of 3d manufacturing will obliterate Chinese cost of labor advantage and reduce US imports from China while increase US export to other countries, in particular Latin American countries because these countries do not possess the technical advancement of the United States and the main factor to determine the cost of an exported product will be the cost of transportation and the U.S. is less distant than China from Latin America. The devel-

opment of free trade areas in the Americas will increase US competitiveness in South America.

- Changes in the Chinese cost of labor: The cost of labor has been increasing in China and a recent study showed that China has currently the third highest labor cost in emerging Asia, with an average of US\$ 2,250/year versus \$1,152 in Vietnam, \$943 in India and \$401 in Myanmar.<sup>4</sup>

The combination of these two factors will slow down Chinese economic growth in the next 50 years and reduce US-China bilateral trade.

#### **1.4. Revolution or Coup D'état**

If the interests of the People's Liberation Army and of the raising middle class conflict with the Chinese Communist Party at some point in the future, there may exist a moment where a coup would be seriously considered by the military, in the interest of maintaining stability. Any shift in China away from a civilian to a military-led form of government would be disastrous for the region and the world. The installation of a military-led government would increase the likelihood of war in the Asia-Pacific region, as well as significantly reverse progress in Chinese economic growth since the 1970s.

#### **The Future of U.S.-Japan Relations and the Role of Pacific Islands**

The security of the Pacific Ocean generally rests on the shoulders of the US military.<sup>‡</sup> In cooperation with 22 Pacific Island Countries and Territories (PICTs) and 30 Pacific Rim countries, the US generally provides support for maritime trade.<sup>5</sup> Instead of one large multilateral security treaty like NATO, the US has bilateral mutual defense treaties with Japan, Philippines, Australia, New Zealand, and South Korea, defends several current and former US territories in the region, and cooperates closely with regional law enforcement.<sup>§</sup> NATO expansion in the Pacific region would strengthen cooperation among democratic countries which are not located in the North Atlantic and incorporate bilateral mutual defense treaties with the United States into a multilateral defense organization. China would respond with another defense military organization which could stem from the Shanghai Cooperation Organization polarizing military alliances in the Pacific.

Japan is a major foreign source of financing for the U.S. national debt and will likely remain so for the foreseeable future. Japan is also a significant source of direct investment in the United States, and the United States is the origin of much of the foreign investment in Japan. In other words, if the US does well, Japan will likely do well, and vice versa. However, with China's increased economic influence in both countries, the relative significance of Japan and the United States as each other's economic partner has diminished. By specifically adding the PICTs to Japanese and US trade and development priorities, the Japan-US alliance can be further strengthened.<sup>¶</sup> The key element to strengthen the political relationship between the two countries relies upon two factors:

<sup>‡</sup> US Pacific Command (USPACOM), headquartered in Honolulu, Hawaii, is generally responsible for peace and stability (i.e. defense) of the Pacific.

<sup>§</sup> For example, Samoa has signed a bilateral Shiprider Agreement with the US that allows Samoan law enforcement officials access to US Coast Guard vessels; the Japan-U.S. relationship in the field of security is based upon the Japan-U.S. Security Treaty originally signed in 1951. See: <http://www.us.emb-japan.go.jp/english/html/japanus/japanusoverview2009.htm>.

<sup>¶</sup> Source: U.S. Department of the Treasury, "Japanese holdings of U.S. Treasury securities underscore the debtor/creditor link between the United States and Japan," p.8, found at: <http://www.ustreas.gov/tic/>

- The future production of nuclear energy in Japan;
- US' ability to supply Japan with Liquefied Natural Gas.

After a tsunami hit Japan in 2011 severely damaging Japan's nuclear reactors, nuclear energy production was halted in the country. However, Japanese authorities have consistently declared their intention to continue production of nuclear energy.<sup>6</sup> Nuclear energy in Japan has a dual importance: economic, since Japan does not extract oil and natural gas, and strategic, because Japan, a signer of the nuclear nonproliferation treaty, with at least 4.7 tons of reactor-grade plutonium reserves, is a quasi-nuclear armament country, which means that it would be able to build 700 nuclear warheads in less than one year.<sup>7</sup>

Japanese demand for energy could be covered in part by U.S. export of natural gas. However, natural gas trading remains primarily isolated within the producing regions and lacks the infrastructure to be a true global commodity. Natural gas maritime shipping takes place in liquid form, because Liquefied Natural Gas has volume that is much smaller than its original volume in compressed form. Liquefaction and transport require special treatments and are highly capital intensive.<sup>8</sup> Morgan Stanley has estimated that North American Liquefied Natural Gas (LNG) export capacity may exceed 10% of the current US daily production by 2015.<sup>9</sup> The increased supply of LNG would reduce the prices of both LNG and oil in the global markets, but increase them in the domestic U.S. market. On one side, it would improve U.S. balance of payments, on the other it would risk to create inflation.<sup>10</sup> The U.S. administration shall carefully consider these implications in formulating its energy policy. For Japan, which is an energy importing country, natural gas would constitute cleaner energy than coal, oil and nuclear energy. Furthermore, the increasing role of China in geo-economic interests will strengthen strategic cooperation between US and Japan.

### ***1.5. The Strategic Role of Indonesia in the Asia Pacific Region***

The relationship between Indonesia and China is centuries old, however the present Chinese regime was not officially recognized until 1957. In 1967, after the replacement of the Sukarno administration by the Suharto government, diplomatic relations were suspended and not resumed until 1990. China is currently one of Indonesia's main trading partners. The Association of South East Asian Nations is China's fourth largest trading partner. Indonesians, however, are hostile to the flood of expensive products entering Indonesia from China.

Increasing concern over conflict over the South China Sea is now exacerbating tensions between the two nations, however. Although Indonesia is not one of the six claimants to the rights in the islands, sea and seabed resources, hostile conflict in the area poses a threat to Indonesia and potentially to its shipping routes. The six claimants to the Sea are China, Malaysia, Brunei, Philippines, Vietnam and Taiwan. In an attempt to ameliorate relations, Indonesia has hosted forums for discussion in which the Chinese delegation has participated, but not formalized any solutions to conflict. China has also indicated its potential claims to regions close to the Natuna Islands, which are in the Indonesian territory and hold potential oil deposits.

Despite these potential conflicts, China and Indonesia have strengthened their military ties, expanding their joint military exercises. In January 2013, the Indonesian Deputy Defense Minister, Sjafrie Sjamsoeddin met with the Chinese Defense Minister in Beijing and

agreed to closer ties that will expand exercises and training relevant to the Sukhoi Su-27 jet fighter and other technological and educational exchanges. This is seen as a counter-balance to increased presence of the United States in the area. Notwithstanding the improvement in the relations between Indonesia and China, Indonesia remains a close ally of the United States in South East Asia and its strategic importance is destined to increase. In fact, its competitive cost of labor, abundance of natural resources and proximity to both India and China give Indonesia a geo strategic advantage that will benefit the country in the near future. It is in the interests of the United States to nurture its relationship with Indonesia through direct aid and a bilateral or multilateral free trade agreement (such as Indonesia joining the TPP).

### ***1.6. The Role of Australia***

Given the fact that Japan and Australia were enemies in World War II and that combatant casualties on both sides were high, it is to the credit of both nations that since the close of the War in 1945, relations between the two nations have dramatically improved. The Commerce Treaty of 1957 laid the groundwork for this reorientation of the two nations. Japan is a purchaser of Australian resources and a provider of well-made manufactured goods. Japanese and Australians have invested in each other's economies and financial markets.

The goal of the two nations is to liberalize trade between them, lowering trade barriers and tariffs.

In contrast to the Australia-Japan Joint Business Conferences mentioned above, the Australia-China Business Conference is disjoined, with the conferences held in Australia being compromised by the Chinese counterparts in China who organize independent conferences and have the effect of discouraging businesses in China that might be interested in doing business in Australia.

## **2. Energy and Resources**

### ***2.1. The Future of the Pacific Rim's Natural Resources***

A sustainable future for the natural resources of the 42 Pacific rim nations depends heavily on how these nations choose to steward their resources. The Asian nations historically drew copiously on their resources, but now are clearly dwindling non-sustainably. Development activity of the last two centuries built industrialization in Pacific temperate-zone nations, while large portions of their populations remained agricultural. The Pacific Ocean, Earth's largest feature, appeared infinite to the Pacific-rim peoples for millennia. Surprisingly, at the Second Millennium's end, resources have limits. Rapid Pacific fisheries' depletion due to factory ships form a "Canary in the Mine": lack of stewardship, lack of restoration, lack of judicious usage, and lack of national concern to marshal Pacific-commons fish resources.

### ***2.2. Water***

The Pacific contains 622 million cubic km water, a major portion of the earth's water.<sup>11</sup> Water cycling from evaporation of the Pacific Ocean is critical not only for the nations rimming the Pacific, but the Pacific Ocean water oscillates weather patterns creating precipitation in the Atlantic and Indian Ocean also. Water cycling from Pacific evaporation is critical not only for the Pacific-rim nations but for the Atlantic and Indian Oceans. The Central

Pacific ocean temperature oscillations “El Nino and La Nina” control Atlantic rainfall and storms.<sup>12</sup> Brazil’s weather patterns vary with these oscillations.<sup>13</sup> Evaporation from the Central Pacific affects the storms and snowfall in the central Indian Ocean’s Himalayas. Since water was formed prior to the origin of the earth in outer space and is a conservative factor for the planet, this Pacific water is a highly important component of life on earth.

The accelerating usage of water in the next 50 years is far more serious a matter which in Central America will double, in South and North America increase by 165% (157 to 258 and from 560 to 903); in China and S. Korea is accelerating greatly.<sup>14</sup> Water deficit may prove to be of extreme difficulty for China, which is facing rapid desertification. Throughout the Pacific Rim, water must be marshaled in industry and sewage so that precipitation is recycled rather than pollutants inserted into rain. The dumping of polluting materials into surface water is a highly unwise use of rivers.

### **2.3. Marine Ecosystems and Fish**

The largest global ecosystems are found in the Pacific marine ecosystems covering 33% of earth’s surface (165.2 million km<sup>2</sup>). Unfortunately, degradation is acute of all Pacific northern hemisphere and south-western sub-basins. FAO indicates that there are only two sustainable fisheries in the world primarily in the south east Pacific–Chile/Peru and around the corner where Antarctic-Pacific waters flow to Argentina/Uruguay.<sup>15</sup> Prof. Daniel Pauley reaffirms this with detailed catch statistics of artisan fishing asserting that the Pacific Ocean fish stock will be depleted in 50 years as we fish “down the food chain”.<sup>16</sup> At the interface of the Pacific and terrestrial rim are its estuaries, the earth’s most productive and biodiverse area which systematically stripped of natural resources over the last century by developments. The policy decisions to be made and solutions including restoration of the services of wetlands, seagrasses, coral reefs, and fisheries need rethinking to renew oceanic vitality. Economics of eco-services lost by degradation and the cost-effectiveness of ROI restoring the nearshore resources are central to present societal decisions. The new biological restoration technologies need distribution throughout newly industrializing nations so each nation can choose policies to restore their valuable resources including large amounts of carbon sequestered in estuarine plants, the fisheries habitat, sediment stabilization and enhanced biodiversity.

### **2.4. Forests and Soils**

Forests originally covered most of the nations of the Pacific, adding oxygen, soil stabilization, habitat, energy sources, and biodiversity throughout the Pacific region.<sup>17</sup> Due to massive logging for development and traditionally for fuel, plus clearing for agriculture, forests have been removed and large-scale soil erosion is accelerating throughout the Pacific basin to pollute estuaries by cutting light to fish nurseries. Southeast Asia and China are prime examples.

### **2.5. Estuaries**

The estuaries are the most productive point of earth. The more ancient and more biodiverse Pacific flora and fauna contain two to six times the number of Atlantic species. We are reaching limits of sustainability on the Pacific estuaries including the estuaries most recently developed in the Western Hemisphere. The estuaries of many Asian areas have been highly

modified and no longer provide the eco-services that even a half century ago they were able to provide such as fish nurseries, near-shore fishing for impoverished villagers.

## **2.6. Arctic and Antarctic**

Arctic and Antarctic are the least polluted areas of the Pacific, due partly to the large volume of the slow deep circulation of the Pacific (which up-wells water from pre-industrial times to form surface waters of the Antarctic and the Arctic).<sup>18</sup> Due to glacial melt in the Arctic passages are opening.\*\*

## **2.7. Energy**

The regions' conventional fossil fuels (wood, charcoal, oil, gas and coal) are in decline in Asia while needs must adapt to the abundant ocean and wind energies plus methane hydrates. Resources of fossil energy lies as presently explored in the North Pacific, especially near the Arctic, and beneath the sea in the East and South China Seas, and Indonesia. Energy demand will increase in North America from 16 billion barrels of fossil fuel to 22 billion barrels; in S. America from 1.5 to 6 and in Central America from 0.1 billion barrels to 0.4 billion. In China, in Japan, S. Korea, and in Indonesia energy demand will minimally double.

## **2.8. Minerals**

Mineral expanses are found in the Pacific nations due to the "Ring of Fire"; volcanic activity has geologically brought minerals to the surface, cooling into mineable ore. Manganese nodules, sand, gravel, rare earth metals, and placer form the chief present minerals found plus iron, copper, nickel, titanium, cobalt, and trace metals.<sup>19</sup>

## **2.9. Solutions**

The public policies of resource conservation put into place post World War II are not sustaining the Pacific Rim natural resources. The United Nations and regional agreements have been inadequate to keep harmful effluents, overfishing, and extractive operations functioning for the common good in the Pacific global commons. What progress is being made by the Law of the Sea in terms of enforcement of its specific agreements? What stewardship is the UN demanding of those nations whose fair share is not of concern to their commercial entities operating in the Pacific water such as factory fishing ships?<sup>20</sup> Is China simply one of the 200 nations and should it be able to maximally extract one-two hundredth of the fish?<sup>21</sup> Is the IMO operating according to its agreements in the Pacific? Indeed who is policing the UN regulations and treaties in the middle Pacific? Who is enforcing the treaties in the 200 mile limits of the small island nations? Who stands to lose the most resources?

Pacific resources exploitation for short-term economic and political gains appears to overshadow the longer-term sustainable stewardship of the Pacific's resources. Many nations watch the resources dwindle and become non-sustainable, while creating no replacement activity for soil, fish, forests, and fresh water. Massive restoration and anticipatory planning throughout all nations including the southern hemispheric nations aimed at keeping specific Pacific resources sustainable should occur everywhere as a beginning to the solutions for this region. Since small nations to massive Russia are at a turning point perhaps a new operational

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\*\* Arctic Council Report 2012

model for resources can occur. The model should include not only micro-credit but definitely microenterprise.<sup>22</sup>

Helping lift people from poverty will help sustain resources, since extreme poverty around the Pacific is creating large resource losses in the region. Solutions can be and are available to those nations acting rapidly and expertly to sustain critical resources that range from soil and clean water to fisheries and minerals. Biodiversity and richness of the Pacific commons along with the eco-services the commons provide are to be stewarded rather than squandered in the next several decades.

### **3. Religion and Health**

#### **3.1. Religion**

As the contemporary world subscribes to an increased prominence of religion in public life, the Pacific area will also be affected by religion on issues of identity and economics. The public role of religion in the future of the Pacific area will become visible in social relations and government policies.

#### **3.2. Religious Makeup of the Pacific: Restrictions, Hostilities and Migration**

In general, hostilities against religion are triggered by the competition for resources and identity clashes, which take place at the intra- and/or interstate level. For example, according to Human Rights Watch in China, despite a constitutional guarantee of freedom of religion, the Chinese government restricts religious practices to officially approved mosques, churches, temples, and monasteries. The government also audits the activities, employee details, and financial records of religious bodies. Religious personnel appointments, religious publications, and seminary applications are subject to government review. Unregistered spiritual groups such as Protestant 'house churches' are deemed unlawful and the government subjects its members to fines and prosecution. The government classifies Falun Gong—a meditation-focused spiritual group banned since July 1999—as an 'an evil cult' and arrests, harasses, and intimidates its members."<sup>23</sup> *The Global Restrictions on Religion* study published in 2009 reported that at the global level, restrictions on religion are placed by governments and by private actors.

Economic migration affects also the religious landscape of the Pacific not only due to the religious identity of the immigrant, but more so because religious organizations are often established in the destination country through an internal mission developed by each organized religion. The Asia-Pacific region is the largest source of migrants in the world (214 million), while North America, Europe, Australia, are the largest destinations. Counting all the persons who had been living for one year or longer in a country other than the one in which he or she was born, the largest single share of international migrants (214 million) has come from the Asia-Pacific region. China is also the fourth largest source of migrants (8.4 million), with over one million Buddhists, about two million belonging to other religions, and over four million who are religiously unaffiliated.<sup>24</sup> According to a Pew-Templeton Global Religious Future Project, the United States has been a leading destination for immigration. The United States is the world's top destination for Christians (74% of all foreign-born people living in the United States); of Buddhists (coming mainly from Vietnam), and for people with no

religious affiliation (including many from China). The United States is also the world's second-leading destination for Hindu migrants, after India, and for Jewish migrants, after Israel. As for Muslim migrants, the United States<sup>25</sup> ranks just seventh as a destination, behind Saudi Arabia, Russia, Germany, France, Jordan and Pakistan.<sup>26</sup> For example, while about half of the Buddhists usually move into countries in the same region, large numbers have moved to North America, as well as to Europe. In the Pacific region, the top sources of Buddhist migrants are China (1,270,000), Japan (390,000) and South Korea (210,000); moving into the United States (1,730,00), Hong Kong (370,000), Australia (340,000), Canada (290,000) and Japan (240,000).<sup>27</sup> Therefore, considering the outlook on religious freedom along with the forecasted birth rate, and growth of religion's influence in the public life for the next 40 years, religion becomes even more relevant to public policy.

### 3.3. Health

Health spending in the Pacific region as a percent of GDP ranges from a low of around 2.5% for Indonesia to a high of 18.9% for the Marshall Islands, the actual dollar amounts per capita can be as low as \$85, which may as well be \$0 for all the benefit it provides for the people. Access to medical care varies significantly in the region with the wealthy countries like Japan having around 2.1 doctors per 1,000 people while Papua New Guinea has fewer than 0.05 physicians per 1,000 people, compared to the 1.8 per 1,000 in China, 2.4 per 1,000 people in the United States (considered a "doctor shortage") or as many as 4 per 1,000 in some of the European countries.<sup>28</sup> Unfortunately, the countries with the fewest physicians also have the fewest nurses and hospitals and hospital beds per 1,000 people with only 0.6 hospital beds per 1,000 people in Indonesia and 1.3 per 1,000 people in Kiribati, compared to 3.0 per 1,000 in the US (behind China's 3.8 per 1,000) and 13.7 hospital beds per 1,000 people in Japan.

The developing nations of the Pacific have higher than average rates of tuberculosis, malaria, dengue, sexually transmitted infections (including HIV) and other infectious diseases.<sup>29</sup>

Access to clean drinking water will continue to be a problem in some areas and should be given a higher priority as it is a significant factor in reducing infection and improving quality of life. When we discuss drinking water, many fail to recognize the fact that 45% of the world's population still does not have the luxury of piped water in their homes and 11% have no access to treated water at all.<sup>30</sup>

As some of the less-developed countries in the Pacific become more industrialized, we may see a shift from indoor air pollution to more outdoor air pollution due to the decreased use of solid fuels for cooking and increasing numbers of factories and cars. Air pollution is closely linked to chronic obstructive pulmonary disease (COPD- including chronic bronchitis), pneumonia, lung cancer and other cancers.<sup>††</sup> Currently, there are an estimated 360,000 deaths each year in the Western Pacific due to outdoor pollution and 500,000 deaths each year due to indoor pollution with a likely switch between the two in coming years.<sup>31</sup> A recent report estimates that more than 1.2 million people die prematurely each year due to air pollution in China alone.<sup>32</sup> The particulates in air pollution usually cause the most harm to health, so the use of more efficient burning technologies and particulate capture technologies should reduce the illness and deaths from pollution in the short term as we work toward cleaner future technologies.

†† Fast facts about particulate matter, Environmental Protection Agency <http://www.epa.gov/pm/fastfacts.html>

Increasing funding for and emphasis on education would be the single greatest benefit to the region as long as those educational programs include nutrition, hygiene, safe drinking water and other public health topics.

Some of the health problems could also be reduced by increasing access to healthier foods and more water purification. Vaccination programs can reduce some of the spread of infectious diseases and we may see vaccines developed for tuberculosis, dengue, malaria and even HIV in the coming years. Increased access to health education and medical professionals in the remote, underserved areas can be attained through video conferencing technologies.

We cannot see the future but the most likely problems are continuations of the current ones so we can have an idea of how we can act now to try to change our future.

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