

3.7 THE GEOGRAPHY THEORY

The striking differences between the long-term histories of peoples of the different continents have been due not to innate differences in the peoples themselves but to differences in their environments . . . if the populations of Aboriginal Australia and Eurasia could have been interchanged during the Late Pleistocene, the original Aboriginal Australians would now be the ones occupying most of the Americas and Australia, as well as Eurasia, while the original Aboriginal Eurasians would be the ones now reduced to downtrodden population fragments in Australia. (Jared Diamond (1997), *Guns, Germs and Steel*, p. 405.)

In this section, I discuss the theories that link geography with development. I classify the existing theories of geography into five different categories. They are as follows: the climate view, the agriculture view, the market proximity view, the disease view and the sophisticated geography view.

The climate view holds that the population in the tropics is not industrious enough largely due to the energy-sapping heat. Natural availability of food in abundance also makes tropical people idle. This has a direct and negative effect on human productivity and hence economic growth (Montesquieu, 1748). In a recent study, Parker (2000) supports Montesquieu's argument. According to his thesis, an individual's desire to maximize utility is dependent on motivation, homeostasis and neural, autonomic and hormonal adjustments. These physiological factors are governed by the hypothalamus. The activity of the hypothalamus is heavily dependent on thermodynamics. In hot conditions, the hypothalamus secretes hormones which negatively affect motivation and enterprise whereas, in cold climates, individuals are naturally hard working. These tendencies affect the steady-state level of income in these two regions. The average steady-state income in cold climates is naturally higher than the average steady state in hot climates. Hence, climate explains two-thirds of the per capita income differences between the tropics and temperate regions.

The agriculture view is due to Gallup and Sachs (2000). This view maintains that high relative humidity and high night-time temperature in the tropics cause high plant respiration and slow down plant growth. They argue that the deficiency in plant growth in the tropics is also related to the lack of nutrients in tropical soil. Humid tropical soils (alfisols, oxisols and ultisols) are typically low in nutrients and organic matter. This limits plant growth and also causes soil erosion and acidification. In addition, the lack of frost allows a greater number of pests to survive and breed. These factors have a debilitating impact on agricultural productivity and inhibit economic progress. In addition to this, an alternative and sophisticated

agriculture view exists due to Diamond (1997). According to this view, prior to the period of colonization, Europeans used technology which was specifically designed to suit temperate conditions. In the late eighteenth and early nineteenth centuries, when the Europeans embarked on a colonization drive, they introduced these technologies in the colonies. They worked well in colonies with temperate conditions, but failed to deliver the same goods in the tropical environment. This explains the low productivity of tropical agriculture and hence slow economic progress.

The market proximity view is due to Sachs and Warner (1995b), Sachs and Warner (1997b) and Gallup et al. (1998). There is no disagreement within the economics community that trade and commerce generate wealth and prosperity (Smith, 1776 [1976]). One of the important preconditions for trade is easy access to major markets. According to the market proximity view, unfavourable geographic location characterized by no or limited access to ports or ocean-navigable waterways, being landlocked is a major impediment to trade and commerce. Access to a port or major markets in this situation often involves crossing international boundaries which makes the cost of transportation relatively high and limits international trade. Absence of international trade in these economies confines all commercial activities to small internal markets. This causes an inefficient division of labour and underdevelopment. If one looks at inland Africa which is also one of the poorest areas in the world, it is quite evident that most of the countries of this region are landlocked. This prevents these countries from effectively participating in international trade because transport costs are too high (Sachs and Warner, 1997b).

The disease view is due to Bloom and Sachs (1998), Gallup et al. (1998) and Gallup and Sachs (2001). According to this view, infectious malaria has a debilitating effect on human productivity and directly affects economic performance. Gallup and Sachs (2001) point out that the countries with intensive malaria grow 1.3 percentage points slower per person per year than countries without malaria and a 10 percentage point reduction in malaria might result in a 0.3 percentage point increase in annual per capita income growth. Bloom and Sachs (1998) also claim that the high incidence of malaria in sub-Saharan Africa reduces the annual growth rate by 1.3 percentage points a year. In other words, eradication of malaria in 1950 would have resulted in a doubling of current per capita income. Sachs (2003a) and Carstensen and Gundlach (2006) in empirical studies report strong and negative effects of malaria on economic progress, even after controlling for institutions and openness.

Finally, the sophisticated geography view is due to Jared Diamond (1997). Diamond, in his book entitled *Guns, Germs and Steel* asks the question: why did history unfold so differently on different continents? He

argues that geography and biogeography moulded the contrasting fates of human lives in different continents. In summary, his hypothesis is as follows.

He argues that geography has endowed mankind with different sources of food and livestock. The Eurasian climate, especially southwest Asia which he calls the 'Fertile Crescent'⁶ was best suited for the growth of the maximum number of edible wild grains and large mammals. Early hunter-gatherers living in this region domesticated these wild grains and adopted a sedentary agriculture-based lifestyle. They domesticated the large mammals for meat, milk and muscle power which they could use in farming. The use of large mammals in agriculture immensely improved farm productivity yielding more and more food surplus. This technology and knowledge spread all across Eurasia along the same latitude. Close contact with the large mammals also led to frequent outbreaks of epidemic diseases among the human population in this region. This helped Eurasians to develop immunity to many of these diseases over the long run. The gift of food surplus and a sedentary lifestyle allowed them to invest more time in the development of guns, steel swords, ocean-going ships and so forth. The societal structure became hierarchical and far more complex than that of the hunter-gatherers.

This, however, was not the case in other continents. In places like New Guinea humans were left with very limited choices of food. No wild grains or large mammals were available for domestication. So humans in New Guinea remained hunter-gatherers. In the Americas, corn was the major grain that was domesticated. Other grains were not available. The continent also lacked large mammals for domestication. The only available option was the llama, which is weak and yields less meat and milk than cows, goats or sheep. The indigenous American population were also not familiar with horses and they lacked immunity to the fatal Eurasian diseases. As a result the Europeans faced little or no resistance from the indigenous American population in their colonial conquest. The Aztecs, the Incas and the Mayas were fighting an unequal battle with the Europeans powered with guns, steel swords, horses and germs. More than two-thirds of the population were wiped out by a smallpox epidemic when they first came into contact with the Europeans. Riding on the power of guns, germs and steel, the Europeans colonized most of the known world, getting access to a large pool of resources, which helped them to develop an advanced industrialized society. The Americas, Australia and New Zealand gained from European migration and the migration of European technology along with them. The rest of the world remained largely impoverished and the gap widened over time with the development of more and more advanced technology in the West.

3.7.1 Diseases, War and Urbanization in Europe

A related but somewhat different theory of geography is from Voigtländer and Voth (2008). They pose the question of why Europe was prosperous relative to the rest of the world during the 1700s. They argue that even though pre-modern Europe was largely Malthusian, the reason behind the divergence in income between Europe and the rest of the world can be explained by three factors, namely, diseases, war and urbanization. War, urbanization and trade-driven disease raised death rates and once death rates were higher, incomes could remain at an elevated level even in a Malthusian world. High density of population, rapid urbanization and the disease-ridden European cities kept the death rates relatively high. International trade also helped spread diseases across the continent.

High death rates meant labour scarcity and higher wages. This changed the nature of demand. As a result people started having more children. However, people still had above subsistence income and they spent their surplus income mainly on manufactured goods produced in cities. This reinforced urbanization and trade. Urbanization raised the risk of diseases and trade raised the risk of war which was financed by taxes from the cities. Therefore they argue that geography, diseases and war had a positive impact on living standards in pre-modern Europe.

3.7.2 Malaria in Africa

The malaria view can be categorized into two broad categories. The first deals with the economic burden of malaria in contemporary Africa, and the second deals with the historical impact of malaria and diseases on the continent's long-run economic development. I call the former the 'contemporary malaria view', whereas the latter is the 'historical malaria view'.

The 'contemporary malaria view' is due to Sachs (2003b). According to this view, malaria dramatically lowers labour productivity and the return on foreign investment and raises transaction costs of international trade, limiting development, which is typically observed in sub-Saharan Africa. I have discussed this view in the following sections.

Sachs (2003a) in a cross-country empirical study shows that institutions do matter, but not exclusively. He highlights the prevalence of malaria as another important factor which should not be underestimated. In a series of studies, Bloom and Sachs (1998), Gallup et al. (1998) and Gallup and Sachs (2001) show that infectious malaria has a debilitating effect on human productivity and directly affects economic performance. Sachs et al. (2004) argue that with malaria and subsequent low productivity of agricultural labour, sub-Saharan Africa cannot generate enough marketable

surpluses which also limits the prospect of market development. Markets, even if they develop, remain concentrated at a very local level. This is indicative of a situation of 'low level equilibrium trap' in these economies.

Acemoglu et al. (2003a) strongly disagree with Sachs's view. They argue that the disease environment influences the balance of power between previously isolated populations when they come into contact. The local disease environment influences the colonization strategy and settlement decision, which sets up the path for future institutional development (Acemoglu et al., 2001, 2002). Therefore, the disease environment affects the level of development indirectly through institutions. I call this the 'historical malaria view'. This view is also closely related to the historian Phillip Curtin's work on epidemiology of the New World and Africa (Curtin, 1968). In this article, Curtin shows that epidemiological factors have influenced economic decisions and economic patterns of the New World (particularly tropical America) and Africa.

Another angle within the 'historical malaria view' is a line of argument that is strongly pursued by a section of the historians. Miller (1982) uses Portuguese traveller's records, missionary and church documents to show that frequent epidemics of malaria and yellow fever caused massive depopulation in the agriculturally marginal zones of West Central Africa. Dias (1981), in a similar study of nineteenth and twentieth century Angola argues the same. They observe that the effects of disease, epidemics and famines were far more powerful than the slave trade in depopulating the region. According to their view, the increase in slave trade was an outcome of local epidemiology and poor agriculture rather than strong Atlantic demand. Bhattacharyya (2009b) also shows that malaria explains long-run economic development in Africa. All other variables including institutions and the slave trade are statistically insignificant.

Miller (1982) writes, 'The slave trade appears in some ways less a cause of depopulation than a consequence of it when viewed in terms of droughts and demographic changes in West Central Africa.' Hence, according to his view, the disease environment had direct effects on the demography and economic development of the region. Inikori (1992) and Manning (1981, 1982), however, provide evidence to show that these effects were not strong enough to have a larger impact on the African population compared to the strong Atlantic demand for slaves.

3.8 THE TRADE OPENNESS THEORY

The greatest improvement in the productive power of labour, and the greater part of the skill, dexterity, and judgement with which it is any where directed,

or applied, seem to have been the effects of the division of labour . . . This division of labour, from which so many advantages are derived, is not originally the effect of any human wisdom, which foresees and intends that general opulence to which it gives occasion. It is the necessary, though very slow and gradual, consequence of a certain propensity in human nature which has in view no such extensive utility; the propensity to truck, barter, and exchange one thing for another (Adam Smith (1776 [1976]), *Wealth of Nations*, Chapters I & II, pp. 7 and 17)

The openness view of development goes back at least to Adam Smith (1776 [1976]) who argues that openness to trade increases the size of the market, which raises the possibility of greater division of labour. Division of labour in turn improves productivity and productivity improvement induces faster economic growth.⁷

The neo-classical theory, however, holds a slightly different view. According to this theory, reduction in trade barriers opens up the possibility of a more efficient exploitation of comparative advantage through reallocation of factors. Labour and capital move towards their highest valued uses improving overall productivity and the welfare of the economy. Growth takes place in the economy due to transitional dynamics. In other words, growth lasts only for the duration of the transitional period and stops after the economy reaches its new steady-state levels of capital and output per worker.

Another significant theory in the openness and growth literature is the technology transfer view. According to the closed economy neo-classical growth models, given the technology level at a particular point in time a country accumulating more physical and human capital grows faster than a country accumulating less of the same, but all of them converge to the same long-run steady-state equilibrium rate of growth (Solow, 1956; Swan, 1956; Mankiw et al., 1992). In this model, income per capita can grow in the long run only when there is exogenous technological progress. In real life, we hardly observe convergence of income. In contrast, what we notice is that the rich economies are growing faster than the poor ones and the gap between the rich and the poor is widening over time.⁸ Coe and Helpman (1995) point out that this gap is due to the variable rate of technological progress. They find evidence that technology catch up or R&D spillover bridges this gap. Dowrick and Rogers (2002), on the other hand, report that the gap is due to variable rates of capital accumulation as well as technological progress. Howitt (2000) builds a theoretical model to show that because of technology transfer, R&D performing countries converge to parallel growth paths, whereas others stagnate. Several others including Coe and Helpman (1995), identify trade openness as a medium of technology transfer. In other words, what these studies argue is that the follower economies adopt technology and knowledge developed in