Chapter 4: Human Capital Formation in India

Exercises — Human Capital Formation in India

Q1 What are the two major sources of human capital in a country?

SOLUTION

The two major sources of human capital in a country are education and health.

Investment in education increases the knowledge, skills and productivity of workers, enabling them to earn higher incomes and contribute more to economic growth. Individuals invest in education with the objective of increasing their future income, just as companies invest in capital goods to increase future profits.

Investment in health directly increases the supply of healthy labour force. A sick worker loses productivity and is compelled to abstain from work. Expenditure on preventive medicine, curative medicine, social medicine, clean drinking water and good sanitation all contribute to health and thereby to human capital formation.

Answer: The two major sources are education and health, both of which increase worker productivity and contribute to human capital formation.

Q2 What are the indicators of educational achievement in a country?

SOLUTION

Educational achievement in a country is generally indicated in terms of three measures:

1. Adult literacy rate: the percentage of people aged 15 and above who can read and write. It reflects the overall educational attainment of the adult population.

2. Primary completion rate: the percentage of children in the relevant age group who complete primary education. It indicates the reach and effectiveness of elementary schooling.

3. Youth literacy rate: the percentage of people aged 15 to 24 who are literate. It reflects recent progress in educational access and gives a forward-looking picture of human capital formation.

Answer: The three indicators are adult literacy rate, primary completion rate, and youth literacy rate.

Q3 Why do we observe regional differences in educational attainment in India?

SOLUTION

Regional differences in educational attainment in India are primarily caused by unequal government expenditure on education across states. As the chapter notes, in 2020-21, per capita public expenditure on elementary education varied considerably across states — from as high as Rs 96,968 in Sikkim to as low as Rs 10,710 in Bihar. These large disparities in spending directly lead to differences in the quality and availability of educational infrastructure,

teachers and facilities.

States that spend more are able to provide better schools, trained teachers, and learning materials, resulting in higher enrolment, lower dropout rates and better attainment. Poorer states with lower expenditure cannot sustain the same quality, leading to lower literacy and completion rates.

Additionally, socio-economic factors such as poverty, child labour, and gender discrimination affect school attendance and dropout rates differently across regions, further widening educational gaps.

Answer: Regional differences arise mainly from wide variation in per capita government expenditure on education across states, which creates unequal access to schools and quality of instruction.

Q4 Bring out the differences between human capital and human development.

SOLUTION

Human capital and human development differ in their underlying perspectives:

Human capital views education and health purely as a means to increase labour productivity. In this view, investment in education and health is valued only if it results in higher output of goods and services. Human beings are treated as a means to an end — the end being increased productivity and economic growth. Any investment that does not enhance output is considered unproductive.

Human development, on the other hand, is based on the idea that education and health are integral to human well-being in themselves. It holds that human beings are ends in themselves, and human welfare should be increased through investments in education and health even if such investments do not result in higher labour productivity. In the human development perspective, every individual has a right to get basic education and basic health care — that is, every individual has a right to be literate and lead a healthy life.

In summary, human capital is a narrower concept that treats people as instruments of production, while human development is a broader concept that treats people as the ultimate purpose of development.

Answer: Human capital treats education and health as means to increase productivity; human development treats them as ends in themselves, with every person having a right to a healthy and literate life.

Q5 How is human development a broader term as compared to human capital?

SOLUTION

Human development is broader than human capital because it encompasses a wider objective for investment in people.

Human capital is concerned only with the economic dimension — it values education and health insofar as they increase labour productivity and contribute to national income. If an investment in education or health does not result in higher output, it is considered unproductive from the human capital perspective.

Human development goes beyond this economic dimension. It holds that human beings are ends in themselves, not merely instruments of production. In the human development perspective, basic education and basic health are important in their own right — every individual has a right to be literate and to lead a healthy life, irrespective of whether this contributes to labour productivity. Human welfare should be increased through investments in education and health even when such investments do not directly raise economic output.

Therefore, human development includes the human capital perspective but is not limited to it. It also covers the right to knowledge, to a long and healthy life, and to make meaningful choices — dimensions that go beyond what is captured in the concept of human capital.

Answer: Human development is broader because it treats education and health as rights and ends in themselves for human well-being, whereas human capital considers them only as means to increase labour productivity.

Q6 What factors contribute to human capital formation?

SOLUTION

Human capital formation is the outcome of investments in the following factors:

1. Education: Individuals invest in education to increase their future income, just as companies invest in capital goods to increase profits. Education increases skills, knowledge and productivity.

2. Health: Expenditure on preventive medicine, curative medicine, social medicine, clean drinking water and good sanitation directly increases the supply of healthy labour force. A healthy worker is more productive than a sick one.

3. On-the-job training: Firms train their workers either in the firm itself under a skilled worker or through off-campus training. This enhances labour productivity, and the return on such expenditure exceeds its cost.

4. Migration: People migrate in search of jobs that offer higher salaries than their native places. Although migration involves costs of transport, higher cost of living and psychic costs, the enhanced earnings outweigh these costs, making migration a source of human capital formation.

5. Information: People spend to acquire information relating to the labour market and markets

for education and health. This information is necessary for making sound investment decisions in human capital as well as for the efficient utilisation of the acquired human capital stock.

Answer: The five factors are: education, health, on-the-job training, migration, and access to information — each increases an individual's income-generating capacity.

Q7 How government organisations facilitate the functioning of schools and hospitals in India?

SOLUTION

In India, education and health expenditures are constitutionally assigned to all three tiers of government — union, state and local governments — and several specialised organisations have been set up to facilitate these sectors.

For education: The ministries of education at the union and state level, departments of education, the National Council of Educational Research and Training (NCERT), the University Grants Commission (UGC) and the All India Council of Technical Education (AICTE) facilitate institutions under the education sector. These organisations set standards, provide funding, train teachers and regulate the quality of education.

For health: The ministries of health at the union and state level, departments of health, the National Medical Commission and the Indian Council for Medical Research (ICMR) facilitate institutions under the health sector. They regulate medical practice, fund research and ensure healthcare standards.

Beyond this, the government intervenes to protect consumers because education and health services create long-term impacts that cannot be easily reversed. Individual consumers may lack complete information about quality and costs, giving private providers monopoly power. The government's role is to ensure that private providers adhere to stipulated standards and charge correct prices, protecting citizens from exploitation.

Answer: Government bodies like NCERT, UGC, AICTE (education) and NMC, ICMR (health) regulate quality, fund institutions and protect citizens from exploitation by private providers.

Q8 Education is considered to be an important input for the development of a nation. How?

SOLUTION

Education is a critical input for national development for several reasons:

First, education increases the labour skill of individuals. An educated person is able to generate more income than an uneducated person because of higher productivity, which contributes to the nation's real national income.

Second, education stimulates innovations. It provides knowledge to understand changes in society and scientific advancements, thereby facilitating inventions and the creation of new products and processes.

Third, the availability of an educated labour force facilitates adaptation to new technologies. As

the National Education Policy 2020 recognises, the world is rapidly changing with big data, machine learning and artificial intelligence, and a skilled workforce is essential to keep pace with these changes.

Fourth, education creates better social outcomes. It enables people to make better choices in life, gives social standing, improves understanding of societal changes and helps women improve their economic independence, their health and their children's welfare.

Fifth, education helps in human development. An educated person can effectively participate in democratic processes and contribute to socio-economic progress, which goes beyond mere productivity gains.

For these reasons, the Seventh Five Year Plan emphasised that human resources development must be assigned a key role in any development strategy, as a trained and educated large population can itself become an asset in accelerating economic growth.

Answer: Education raises labour productivity, stimulates innovation, enables adoption of new technology and creates broad social benefits — all of which are essential for national development.

Q9 Discuss the following as a source of human capital formation: (i) Health infrastructure (ii) Expenditure on migration.

SOLUTION

(i) Health infrastructure as a source of human capital formation:

A sick labourer without access to medical facilities is compelled to abstain from work, leading to loss of productivity. The amount of money spent on preventive medicine (vaccination), curative medicine (medical intervention during illness), social medicine (spread of health literacy) and provision of clean drinking water and good sanitation are various forms of health expenditure. Health expenditure directly increases the supply of healthy labour force. A healthy worker provides uninterrupted labour supply for a longer period of time. Hence, expenditure on health infrastructure is an important source of human capital formation.

(ii) Expenditure on migration as a source of human capital formation:

People migrate in search of jobs that fetch them higher salaries than what they may get in their native places. In India, unemployment is the reason for rural-urban migration. Technically qualified persons like engineers and doctors migrate to other countries because of higher salaries. Migration in both cases involves cost of transport, higher cost of living in the migrated places and psychic costs of living in a strange socio-cultural setup. However, the enhanced earnings in the new place outweigh the costs of migration. The migrant worker, by settling in a higher-productivity environment and improving skills, adds to the stock of human capital. Hence, expenditure on migration is also a source of human capital formation.

Answer: (i) Health expenditure increases the supply of healthy, productive workers. (ii) Migration expenditure is recovered through higher earnings in the new location, making it a source of human capital formation.

Q10 Establish the need for acquiring information relating to health and education expenditure for the effective utilisation of human resources.

SOLUTION

People spend to acquire information relating to the labour market and other markets like education and health. Such information is necessary for two reasons:

First, for making sound investment decisions in human capital: People want to know the level of salaries associated with various types of jobs and whether educational institutions provide the right type of employable skills and at what cost. Without this information, individuals may invest in the wrong type of education or health services, leading to a poor return on their investment. Well-informed investment decisions ensure that human resources are channelled into the most productive uses.

Second, for the efficient utilisation of acquired human capital: Even after acquiring skills and education, a person needs information about where those skills are in demand. Without accurate labour market information, a trained person may remain unemployed or be employed below their skill level, wasting the human capital already formed.

Therefore, expenditure incurred for acquiring information relating to the labour market and other markets is itself a source of human capital formation, as it helps ensure that existing and future human capital is put to its best possible use.

Answer: Information on labour markets, education costs and health services is essential for making sound human capital investment decisions and for efficiently deploying acquired skills.

Q11 How does investment in human capital contribute to growth?

SOLUTION

Investment in human capital contributes to economic growth through several channels:

First, it raises labour productivity. The labour skill of an educated person is more than that of an uneducated person, and hence the former generates more income. A healthy worker provides uninterrupted labour supply for a longer period. Both education and health increase an individual's income-generating capacity, which translates into higher national income.

Second, it stimulates innovations. Education provides knowledge to understand changes in society and scientific advancements, facilitating inventions and new ideas. Innovations expand the production frontier of a nation.

Third, it creates ability to absorb and adapt new technologies. The availability of an educated labour force facilitates adaptation of new technologies, enabling faster productivity growth.

The Seventh Five Year Plan stated that a trained and educated large population can itself become an asset in accelerating economic growth and ensuring social change in desired directions.

However, empirical evidence on the direction of causality is somewhat nebulous. Measurement problems arise because years of schooling or teacher-pupil ratios may not reflect quality of education. Analysis shows convergence in human capital measures across developing and developed countries, but not yet in per capita real income, suggesting the relationship is complex and causality may flow in either direction — higher income causes more investment in human capital and vice versa.

Answer: Investment in human capital raises labour productivity, stimulates innovation, and enables adoption of new technology, all of which increase national income and economic growth.

Q12 'There is a downward trend in inequality world-wide with a rise in the average education levels'. Comment.

SOLUTION

The statement reflects the idea that as average education levels rise globally, inequality tends to decline, because education improves the income-generating capacity of a larger section of the population.

The chapter notes that both education and health investment increase an individual's income-generating capacity and contribute to economic growth. When more people receive education, especially in developing countries, the productivity of a larger workforce rises, potentially narrowing income gaps between the educated and uneducated.

However, the empirical picture presented in the chapter is nuanced. It notes that the growth in human capital in developing countries has been faster but the growth of per capita real income has not been that fast. There is convergence in the measures of human capital but no sign of convergence of per capita real income. This suggests that while education levels may be converging worldwide, income inequality between developed and developing countries has not yet fallen correspondingly.

Moreover, within countries, there are significant disparities. In India, for instance, there are wide regional differences in educational attainment, and higher education is associated with higher unemployment among youth in some cases — indicating that quality and relevance of education matter, not just quantity.

Therefore, while rising education levels have a positive role in reducing inequality, the relationship is not automatic. The quality of education, labour market conditions and government policies all determine whether improved education translates into reduced inequality.

Answer: Rising education levels can reduce inequality by widening access to higher incomes, but the chapter shows that convergence in human capital has not yet led to convergence in per capita income, so the link is not automatic.

Q13 Examine the role of education in the economic development of a nation.

SOLUTION

Education plays a multifaceted role in the economic development of a nation:

First, education increases labour productivity. The labour skill of an educated person is more than that of an uneducated person and hence the former is able to generate more income. This directly contributes to economic growth measured as an increase in real national income.

Second, education stimulates innovations. It provides knowledge to understand changes in society and scientific advancements, facilitating inventions and innovations. The National Education Policy 2020 highlights the need for a skilled workforce in mathematics, computer science, data science, biology, chemistry and social science to meet the demands of a rapidly changing knowledge landscape.

Third, educated labour facilitates adaptation of new technologies, enabling firms and sectors to become more competitive and productive.

Fourth, education has important social dimensions. It gives people social standing, enables better life choices, improves women's economic independence and health outcomes, and contributes to democratic participation. An educated person can effectively participate in democratic processes and contribute to socio-economic progress.

Fifth, the Seventh Five Year Plan recognised that a trained and educated large population can itself become an asset in accelerating economic growth and ensuring social change in desired directions.

The government's role in promoting education is therefore essential — the Education Commission (1964-66) recommended spending at least 6 per cent of GDP on education to achieve a noticeable rate of growth in educational achievements, and the Right of Children to Free and Compulsory Education Act 2009 made free education a fundamental right for children aged 6-14.

Answer: Education raises productivity, stimulates innovation, enables technology absorption, improves social outcomes and is recognised as central to accelerating economic growth and social change.

Q14 Explain how investment in education stimulates economic growth.

SOLUTION

Investment in education stimulates economic growth through the following mechanisms:

First, it raises labour productivity. An educated person has higher labour skill than an uneducated person and is therefore able to generate more income. Since economic growth means an increase in real national income, a more educated workforce directly drives growth.

Second, it stimulates innovations. Education provides knowledge to understand changes in society and scientific advancements, thereby facilitating inventions and innovations. New products, processes and ideas expand the productive capacity of an economy.

Third, it facilitates adoption of new technologies. The availability of an educated labour force makes it easier for firms and industries to adapt to new technologies, increasing economy-wide efficiency and output.

Fourth, it creates positive externalities. An educated person can make better choices, contribute to democratic processes and help spread knowledge in the community. These social benefits indirectly support a stable environment for economic activity.

The Seventh Five Year Plan stated that human resources development must be assigned a key role in any development strategy, and that a trained, educated population can itself become an asset in accelerating economic growth. The National Education Policy 2020 further identifies multidisciplinary skills across sciences, social sciences and humanities as increasingly essential as the global knowledge landscape changes with big data, AI and climate challenges.

Answer: Investment in education raises labour productivity, stimulates innovation, enables technology adoption and creates social externalities — all of which increase real national income and drive economic growth.

Q15 Bring out the need for on-the-job-training for a person.

SOLUTION

On-the-job training is a source of human capital formation that serves several purposes:

First, it enhances labour productivity. Firms train their workers either within the firm under the supervision of a skilled worker, or by sending them for off-campus training. In both cases, the training results in enhanced labour productivity, and the return of such expenditure in the form of enhanced labour productivity is more than the cost of it.

Second, it equips workers with specific skills needed for their roles. General education may not provide the specialised technical knowledge required in a particular firm or industry. On-the-job training bridges this gap, making workers more effective and efficient in their specific tasks.

Third, it benefits firms by improving output quality and quantity. Because firms incur expenses for this training, they typically require workers to remain employed for a specific period after training, during which the firm recovers the benefits of the enhanced productivity.

Fourth, on-the-job training contributes to the broader economy by continuously upgrading the skill base of the workforce, helping industries adapt to technological changes and remain competitive.

Answer: On-the-job training upgrades specific work skills, enhances labour productivity beyond what general education provides, and benefits both the worker and the firm — making it a key source of human capital formation.

Q16 Trace the relationship between human capital and economic growth.

SOLUTION

Human capital and economic growth are closely interrelated, though the direction of causality is complex.

Education and health, the major components of human capital, increase an individual's income-generating capacity. The labour skill of an educated person is more than that of an uneducated person, and hence the former generates more income. A healthy worker provides uninterrupted labour supply for a longer period. Both factors raise labour productivity, which contributes to higher real national income — the measure of economic growth.

Human capital also stimulates innovations and facilitates adoption of new technologies, both of which further accelerate economic growth.

India recognised this link early. The Seventh Five Year Plan stated that human resources development must be assigned a key role in any development strategy, and that a trained and educated large population can itself become an asset in accelerating economic growth.

However, empirical evidence is somewhat nebulous due to measurement problems. Education measured in terms of years of schooling and enrolment rates may not reflect quality; health measured in life expectancy and mortality rates may not reflect true health status. Analysis shows that human capital growth in developing countries has been faster, but per capita real income has not grown as fast, with no convergence in per capita income.

There are reasons to believe that causality between human capital and economic growth flows in either direction — higher income enables more investment in human capital, and higher human capital causes growth of income. Table 4.1 in the chapter shows that the education and health sectors and real per capita income have grown simultaneously in India, with growth in each sector reinforcing every other.

Answer: Higher human capital (through education and health) raises productivity and stimulates innovation, driving economic growth; conversely, higher income enables greater human capital investment — causality flows both ways.

Q17 Discuss the need for promoting women's education in India.

SOLUTION

The chapter highlights several important reasons for promoting women's education in India:

First, the differences in literacy rates between males and females are narrowing, which is a positive development; however, the gap remains significant and needs to be closed further. As per data in Table 4.2, adult female literacy was 66 per cent in 2017-18 compared to 82 per cent for males.

Second, women's education improves their economic independence and social status. Education enables women to participate in the labour market, earn their own income and have a greater say in household and community decisions.

Third, women's education has a favourable impact on fertility rate. Educated women tend to have fewer children and better plan their families, which helps manage population growth.

Fourth, education of women improves health care of women and children. Educated mothers are better able to ensure proper nutrition, sanitation and medical care for themselves and their children, reducing infant and maternal mortality.

Fifth, the chapter notes that the most severely affected group in terms of youth unemployment is young rural female graduates — about 30 per cent of them are unemployed. This reflects the need for not only educating women but also improving the quality and relevance of women's education to ensure employability.

For these reasons, the chapter concludes that we cannot be complacent about the upward movement in literacy rates and that we have miles to go in achieving cent per cent adult literacy, with women's education being a key priority.

Answer: Women's education is essential to improve their economic independence, social status, health outcomes, and fertility management — and to close the persistent gender literacy gap in India.

Q18 Argue in favour of the need for different forms of government intervention in education and health sectors.

SOLUTION

Government intervention in education and health sectors is necessary for several reasons:

First, education and health services create both private and social (external) benefits. An educated person can participate in democratic processes and contribute to socio-economic progress. A healthy person, by maintaining hygiene and sanitation, stops the spread of contagious diseases. Because private providers cannot capture all social benefits, they tend to underprovide these services — making government intervention necessary to achieve the socially optimal level.

Second, expenditures on education and health make substantial long-term impacts that cannot be easily reversed. A child admitted to a poor-quality school suffers educational damage that is

difficult to undo before a decision is made to shift institutions. This irreversibility justifies government intervention to set minimum standards and ensure quality.

Third, individual consumers of these services often lack complete information about the quality of services and their costs. In this situation, providers acquire monopoly power and may exploit consumers. The government's role is to ensure that private providers adhere to government-stipulated standards and charge the correct price.

Fourth, in a developing country like India with a large section of the population living below the poverty line, many people cannot afford basic education and health care. When these are recognised as rights of citizens, the government must provide them free of cost for deserving citizens and those from socially oppressed classes.

Therefore, the union and state governments have been stepping up expenditures in the education sector over the years — the Government of India enacted the Right of Children to Free and Compulsory Education Act in 2009 and levies a 2 per cent education cess on all Union taxes to fund elementary education.

Answer: Government must intervene because education and health generate social benefits beyond private gains, are irreversible, face information asymmetry, and must be provided free to the poor who cannot afford them.

Q19 What are the main problems of human capital formation in India?

SOLUTION

India faces several key problems in human capital formation:

First, inadequate government expenditure on education. The Education Commission (1964-66) recommended spending at least 6 per cent of GDP on education for a noticeable rate of growth in educational achievements. The current level of a little over 4 per cent of GDP has been quite inadequate compared to this target.

Second, unequal regional distribution of educational expenditure. Per capita public expenditure on elementary education varies enormously across states — from Rs 96,968 in Sikkim to Rs 10,710 in Bihar in 2020-21. This leads to wide differences in educational opportunities and attainments across states.

Third, persistent illiteracy. Though literacy rates have increased, the absolute number of illiterates in India is as much as India's total population at the time of independence. Achieving cent per cent adult literacy remains a distant goal.

Fourth, gender inequality. Despite narrowing, the gap in literacy between males and females persists, with female literacy at 66 per cent and male at 82 per cent (2017-18). Promoting women's education remains an urgent challenge.

Fifth, the steep education pyramid. The Indian education pyramid is steep — fewer and fewer people reach higher education levels. Moreover, the unemployment rate among educated youth is the highest, indicating a mismatch between education imparted and employable skills.

Sixth, inadequate quality of education. Measures like years of schooling may not reflect quality; students may pass through the system without gaining employable skills.

Answer: Main problems are: inadequate education spending (below the 6% GDP target), large regional disparities, persistent illiteracy and gender gaps, a steep education pyramid, high educated-youth unemployment, and poor quality of education.

Q20 In your view, is it essential for the government to regulate the fee structure in education and health care institutions? If so, why?

SOLUTION

Yes, it is essential for the government to regulate the fee structure in education and health care institutions. The chapter provides clear reasoning for this:

First, individual consumers of education and health services do not have complete information about the quality of services and their costs. This information asymmetry gives providers — especially private ones — monopoly power, which can lead to exploitation of consumers through excessively high fees.

Second, expenditures on education and health make substantial long-term impacts that cannot be easily reversed. Once a child has been enrolled in a costly institution for years, or a patient has undergone expensive treatment, it is very difficult to undo the financial burden. Regulating fees protects families from irreversible financial harm.

Third, in a developing country like India with a large section of the population living below the poverty line, unregulated fees would make basic education and health care inaccessible to the poor. Since basic education and health care are considered rights of citizens, the government must ensure they remain affordable.

Fourth, the chapter states that the government's role is to ensure that private providers of education and health services adhere to the standards stipulated by the government and charge the correct price. Fee regulation is one instrument to fulfil this role.

Without fee regulation, private providers can price services beyond the reach of the majority, undermining human capital formation and widening social inequality. Therefore, regulation of fees, along with ensuring quality standards, is a necessary form of government intervention in these sectors.

Answer: Yes — information asymmetry gives private providers monopoly power, poor families cannot afford unregulated fees, and basic education and health are rights; government must regulate fees to ensure access and prevent exploitation.