

The Spillover Effect of Female Education in India: Opportunities and Unexpected Repercussion

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Abstract

Women education plays a vitalized role in nation building and also contributes towards sustainable development in 21st century. Women education prompted a discussion over its inter generational impact which promote economic self dependence over knowledge system. This paper unravels the tenets of women education and there indirect or direct effect on achieving the vision of Viksit Bharat mission @ 2047 and Atam Nirbhar Bharat through the women empowerment.

Women's education is not just one development target; it is a potent catalyst for almost all of the SDGs, with repercussions that affect everything from health and economic growth to democratic participation and environmental sustainability. In addition to being a social requirement, contributing to women's educational opportunities is also an excellent financial decision. It improves demographic outcomes, lowers poverty, increases worker productivity, and guarantees sustainable economic growth. Women's empowerment via education is a vital route for India, a nation striving for inclusive and swift prosperity. Education contributes faster progress towards equitable, more prosperous and resilient future.

Keywords: spillover effect, ICT, women education, sustainability and social equity.

Introduction:

Education plays a vitalized role for broad based economic growth and empowering citizens to serves some productive in and participate in the growth process of nation. The term "spillover effects" describes the unintended effects of woman of an action or policy that reach beyond the direct beneficiaries. There are consequences for families, communities, social progress and community developments, businesses, and even national governing structures when it involves women's education. It refers to entire household benefits through improved income, health and knowledge, a kind of community behaviors shift.

A great philosopher Plato, Marry Wollstonecraft, J.S. mill, and etc are numerous ancient Greek political thinkers who advocates for the female education. Just like Indian political thinkers and social reformers Raja Ram Mohan Roy, Pandita Rama bai, Periyar, B.R. Ambedkar and etc know the importance of woman education and there consequences.

The Indian government affirms that gender equality and women's empowerment via education are sector of education. Women are regarded as a significant social group that contributes to the advancement of the nation through advancements in a number of areas, including politics and the economy. It has long been recognized that women's education is essential to progress. It fosters economic growth, lowers

poverty, advances gender equality, and enhances health outcomes. However, the intricacies and paradoxes present in the distribution and experience of these advantages are frequently hidden by this prevailing narrative. It examines the probable benefits of increasing educational options for women as well as any unexpected drawbacks. Focusing on girls' education has other externalities in addition to the inherent advantages of advancing gender equality and women's status, such as delayed marriage, reduced fertility, and enhanced women's gains in their own and their children's health outcomes, enhance social mobility, as well as labor force involvement and contributes towards economic development of the nation, it also impact on the environmental and demographic benefits. Indirectly spillover woman education effect also contributes to fulfill MDG (millennium development goals) and SDG (sustainable development goals).

There are multiple dimensions of spillover effects of women education in various sectors in India. In the age of digitalized world it offers a massive opportunity to females generate some productive. It refers to the diffusion of innovation, using e platforms and broader adoption of digitalized practices. This paper provides an insight about comparative analysis of spillover female education effect on the rural and urban space in India. It reveals communalities and sharp contrast between rural and urban area.

Thematic Literature Review

Various Dimensions of spillover female Education in India

Female education plays a vitalized role to strengthening nation development and improving peoples live. Education as human capitals which enhance individual productivity and provide opportunity to serves the nation. The wide-ranging, frequently intergenerational implications of women's education that extend beyond the individual educated woman are referred to as spillover effects. Families, communities, businesses, and entire nations may be impacted by these consequences.

1. Economic Spillover effect :

Educated women not only improve individual well being and societal development but females also serve as a key driver of long term economic growth and development of the country. (Khan, Majeed, & sayeed, 2020) Through this paper they are trying to give conceptual linkage between economic growth and woman education. While quoting Tilak and Jandhayala author demonstrated that women's education and economic development are strongly positively correlated. Investigate claims that a definite association exists between women literacy levels and Gross Domestic Product (GDP) and it has been established that, an increase in literacy levels from 20%- 30%, translates into an enhancement in GDP from 8%- 16% for a number of countries worldwide. Greater formal employment prospects result from higher educational attainment, which lessens reliance on low-wage or informal labor. It provides entrepreneurship opportunity to boost the economic growth.

Woman can able to contribute the intergenerational economic mobility. (Khan, Majeed, & sayeed, 2020) Through the education can leads to a higher rate of female labor force participation which positively contributes to GDP Growth. Furthermore, studies suggest that for India's women's education to advance economic growth and labor productivity, it must go beyond. Educated women can more pool up the skilled labor.

In another paper (Averett, Argys, & Hoffman, 2017) trying to built relationship between women education and labor force participation in the developing country with the help of U curve analysis. It also explores the causes and the consequences of labor force participation which improves labor market. With the help of education woman able to switch brawn based industry to services sector which provides

greater job opportunities. Two major trends in developing countries are the rise of female labor and force participation and closing the gap in school enrollment (Averett, Argys, & Hoffman, 2017). Reducing Poverty and Promoting Income Equality, Higher family earnings, improved financial planning, and decreased poverty are all results of women's education. It promotes more inclusive economic development by reducing the gender wage gap.

2. **Health and Demographic Spillover effect:**

Women with higher levels of education are more likely to get their kids vaccinated, eat healthier, and seek medical attention. Maternal health: Better prenatal treatment and lower maternal mortality are the results of increased knowledge. Decreased fertility rates: Later marriages and fewer children are frequently the results of education.

(Jha & Banerjee, 2025) This paper investigates the effect of education and diffusion of information on fertility choice of women in India through social learning and social influence.

The association between education and fertility can be explained by a number of possible causes. In general, education can alter women's desired number of children by exposing them to more "liberal" ideas or by raising the opportunity cost of time spent outside of the home, which enables them to better attain their desired fertility in situations where women usually have more children than they say they want.

“One of the strongest empirical relationships is between education and early fertility: there is considerable evidence from a wide variety of settings that plausibly exogenous increases in women's education delay fertility” (Averett, Argys, & Hoffman, 2017) p. 12

Another paper by Bhuwania, Mukherji, & Swaminathan, 2024 trying to focusing on girl's education includes delay marriages, fertility reduction and improve health for themselves and their children. There is a causal relationship between the child mortality and the woman education.

(Kebede, Striessing, & Gujon, 2021) Study Demographic and Health Surveys (DHS) data from over 300,000 women in 33 sub-Saharan African nations to examine the relationship between women's education and their reproductive desires. To examine effects at the individual and national levels, the authors use multilevel models. They majorly study the impact at three levels- Impact at the Individual Level: Women who have higher education are substantially less likely to want to have more children. Because they have greater access to reproductive health services, economic goals, and awareness, educated women are more likely to choose fewer families. Contextual Variation: The socioeconomic and cultural conditions of each nation influence how strong this link is. In urbanized and economically developed environments, the impact of education is greater. Policy Implication: Increasing women's educational opportunities can significantly impact population control and development objectives.

3. **Educational (Intergenerational Impact) Spillover effect:**

An educated mother can also understand the value of education in the 21st century. She makes her child more able to grab all the opportunity from education. Through this the gross enrollment ration of enrollment going to be increase in India. The health, nutrition, and academic performance of children are enhanced by mothers' education. This promotes long-term economic growth by creating a workforce with more skill in the future. It enhances next generational human capital for competitive world.

A beneficial cycle is created when women with greater levels of education prioritize their children's education, particularly for their daughters. Children's academic success is positively correlated with the educational attainment of their parents.

A study conducted by Andrabi to know the educational effect on the intergenerational education, he finds that “children of mothers with some education spend seventy-two more minutes per day in educational activities at home than those whose mothers have no education and as a result have higher test scores”. (Averett, Argys, & Hoffman, 2017) p. 13

Another article by (Jha, Jha, & Islam, 2025) exclusively examines the impact of government policy or initiative which boost up the enrollment of girls in the educational institution. This paper provides a in depth case study of Bihar, focusing on the impact of three governmental programs. They finds that cycle and cash incentive program roobustly effecting girls participation in Bihar.

4. Social and Civic Spillover effect:

Through increased civic engagement, social cohesiveness, and leadership, women's education promotes community development. Women with higher levels of education are more likely to participate in activism, community development, and governance, which improve institutional results. This has a significant but indirect impact on the standard of governance and public services, which promotes stability and expansion in the economy. Woman can also play vitalized in decision making.

(Bhuwania, Mukherji, & Swaminathan, 2024) Try to evaluate the Mahila Samkhaya Scheme which was introduced in the NEP 1986, which sought to address gender disparities in the sector of education. Empowering women at the community level became more essential in the age of digitalization. Mahila Samkhaya aims to collectivize marginalized females in the rural area. It provides a platform.

(Kamat, 1976) He explores the dynamic relations between women education and societal change in India. Author uses historical approach to critically analyses the impact of education and societal changes. Societal spillover affects leads to fewer child, better health outcomes and transformative potential. An early but perceptive critique of the hopeful beliefs that associate education with social change can be found in Kamat's work. Although the scope of women's education has expanded, structural injustices, cultural opposition, and policy flaws limit the possibility of it as a liberating force. According to Kamat, genuine change requires a more extensive overhaul of India's educational system's goals and methods.

5. Environmental and Demographical Spillover effect:

Demographic trends and environmental sustainability are greatly influenced by women's educational attainment. Women with higher levels of education are more likely to embrace sustainable lifestyles and take the initiative to solve environmental issues in their homes and communities. Particularly in rural communities, educated women frequently take the initiative to promote resource conservation, organic farming, and climate-resilient farming practices.

They are more inclined to adopt waste reduction, water conservation, and clean cooking energy programs because they are more conscious of the long-term effects of environmental damage. (OCED) Population Management and Demographic Transition Education improves women's reproductive health knowledge, which results in lower fertility rates, delayed marriage, and educated contraception use. Mothers with higher levels of education are more likely to space out their pregnancies appropriately, which benefits both the health of the mother and the kid. It may Reduced environmental deterioration, more sustainable urban planning, and effective use of natural resources are all made possible by a smaller and healthier population. The impact of educated women on household consumption habits leads to more environmentally conscious lifestyles, which improve environmental results for the entire community.

6. Political Representation and Decision Making Spillover effect:

The spillover effect of woman education may also deals with the sphere of political representation and the analysis the role of decision making. Our constitution gave 1/3 reservation to woman in the elections through 73rd, 74th, 106th constitutional amendment to empowers woman representation. India as a democratic country each and every citizen of India has a right to vote, freedom of speech. Education enables women to efficiently serve as Sarpanches, ward members, or SHG leaders, as well as to run for local office. Female MPs with more education are more likely to: Talk in public places, Recognize policies and budgets, Make sanitation, health, and education a top priority in village development plans. Education as a key to represents their voices and agencies. “Beti Bachao Beti Padhao” was launched by prime minister on 22nd January, 2015. It’s a tri ministerial effort of Ministry of women and child development, health & Family welfare and Human resource development. (Beti bachao, Beti Padhao) The role of a woman in her home might also be influenced by education. According to Thomas (1990), there is a larger association between women's education and daughters' health than daughters', which is in line with the idea that women's education and bargaining power are related as well as mothers liking or disfavoring daughters more than fathers. However, other research indicates that education has no effect on a woman's ability to negotiate, as measured by her self-reported involvement in domestic decision-making. (Averett, Argys, & Hoffman, 2017)

Digitalization and Spillover effect of Woman Education:

Digitalization and women's education have a strong collaboration that transforms societies, particularly among developing nations like India. Below is a detailed examination of how digital technologies and women's education combine to create wider social, economic, and ideological spillovers. In the age of modernization digitalization breaks the cycle of poverty and gender inequity that persists throughout generations.

Equal rights for women can be improved by ICT. By improving access to information, financial services, welfare, and identification, digital technology can aid in the eradication of gender disparities. Many of the barriers women face can be eliminated by technology, giving them access to new financial opportunities and enabling them to enter the labor, thus enhancing their prospects. Digital technology has changed the way we organize and the tactics we employ, dismantling borders, undermining the authority of the state, creating knowledge, and creating networks of unfathomable solidarity. The digital revolutions alter how people interact, live, and work. Gender equality is crucial on a global scale. Additional dimensions have been introduced by ICTs. ICTs enhance government, service delivery, and opportunities for underprivileged groups. ICT policies that are gender-neutral can increase employment for women. SDG 5 aspires to increase the use of ICTs to achieve gender equality and empower all women and girls.

It provides new entrepreneurship opportunities which boost productivity and skills to overcome their financial needs of their families and contributes to economic growth at a large scale of country. Digital tools, such as cell phones, online banking, and e-learning platforms, e-commerce are more likely to be adopted and used by educated women, who know the full utilization of resources. Education enhances digital literacy, which gives women access to information on government initiatives, employment prospects, health, and rights. Women increase community digital penetration by supporting others (neighbors, relatives) in understanding and using digital services. Using digital tools, educated women curate and disseminate knowledge on issues such as healthcare, financial literacy, and legal rights. They

also mediate digital materials for people or non-literate members of the community (e.g., teaching how to read a WhatsApp message or utilize a government app).

Female Education: Contributing to Fulfill SDG Goals

(Dutta & Ghosh, 2020) in their book are trying to analyse India's domestic and international policy towards sustainable development goals (to strengthening the renewable clean energy resources) from the Brundtland report (1987) the concept of sustainability began to further demand for the 'new paradigm of development'. In his book author trying to explain the triple bottom line of sustainability aspects (economic, social, environmental) this book reveals the contemporary sustainability narratives in India with six thematic areas: poverty, gender health, quality education, clean water energy, economic growth sustainable cities, land and water, global partnership and analyses the challenges regarding SDG goals in India domestically and international. Total we have 17 SDG goals with 167 targets (United Nations SDG goals) in which female education may fulfill numerous development goals.

Children's health, nutrition, and academic performance are all enhanced by mothers' education. This promotes long-term economic growth by creating a workforce with more skill in the future.

It may trigger broadly become a social change. (Khan, Majeed, & Sayeed, 2020). Women education is not just a single development goal but a powerful catalyst for nearly all SDG goals.

SDG goal 01 no poverty, SDG Goal 02 zero hunger, SDG goal 03 good health and well being, SDG goal 04 quality education, SDG goal 05 increase gender equality, SDG goal 08 decent work and economic growth, and SDG goal 10 Reduce inequality (UNO), which effected by the spillover effect of the female education.

Unexpected Repercussion of Female Education:

Unexpected repercussion refers to those consequences of event which are unintended often negative and they are not predictable in nature. As education of females have too many positive output on the society within that there is numerous unexpected repercussion highlights the fact that the consequences are not only the result from the action but unforeseen and supervising. Despite the overwhelming positive spillover benefits of woman's education, there may be occasionally ne institutional limitations that influence how the advantages of education materialize. The cause of these issues rather than being intersects to women education itself.

Within that social tension and resistance, Patriarchal systems backlash in which educated women who question traditional gender roles may encounter hostility or even violence from their families or communities in conservative nations, double burden of child care and job, Intergenerational conflict in which Family conflicts may arise when educated girls question cultural norms or parental authority. Frustration and Underemployment Education and opportunity are not aligned, Due to underdeveloped labor markets or gender discrimination, educated women in many developing nations have few work options, which can result in: Disappointment and frustration Forced migration or brain drain, a kind of Tokenism through Women may be "educated" in some institutions, but they may not be given real authority or given the opportunity to take the lead. The Weight of Dual Roles Well-educated women are frequently required to juggle conventional household duties with professional professions, which add to their burden and stress.

Conclusion:

Education as the weapon for female to emancipate themselves, it's a kind of human capital which is productive in nature. Educated women enhance individual capital and next generational capital. The indirect, broader advantages of female education that go beyond the specific educated woman are referred to as spillover effects. Families, communities, and societies are all impacted, and these outcomes result in long-term improvements in the social, political, health, and economic spheres.

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