**Short communication**

**Trends and Patterns of Migration Remittances in Kerala: An insight from Kerala Migration Survey**

**Abstract**

In Kerala, major chunk of state income obtained through migration and remittance. Remittance received by the state has manyfold socio-economic consequences. This paper verifies trends and patterns of remittance in Kerala by using Kerala Migration Survey (KMS) as prime data source. This paper realized steady increase in remittance from 2003 to 2018, but Gini ratio (0.26) revealed moderate regional disparity in remittance. The remittance inflow widens the gap between migrant and non-migrant households in terms of income and consumption expenditure. Similarly, utilization of remittance revealed that investment is more on real estate rather than productive activities.

*Keywords: Migration, Remittances, Skilled Migration, Regional Disparity, Kerala Migration Survey*

1. **Introduction**

Kerala, one of the southern states of India, basically depending on migration for the last six decades. Kerala’s foreign migration is around 2.1 million in 2018, which exhibited an upward trend and reached 2.2 million in 2023 (Rajan SI 2024). Almost all the external migration in its earlier phases concentrated towards the middle-east, popularly known as Gulf Cooperation Council (GCC) countries. In the present context also, majority of the migrants targeted the gulf countries for their livelihood. As a result of the migration, remittance became significant source of income to the state’s economy. Total remittance to the state reached Rs. 2,16,893 crores in 2023, a 154.9% increase from Rs. 85,092 crores in 2018 (Rajan SI 2024). Historically, beginning of the large outflow of foreign migration, especially, towards GCC countries dates back to 1970s. The important driving force behind the mass outflow of employees were meagre domestic earnings, high domestic unemployment, stagnated domestic economy and comparatively better yields from abroad. Huge inflow of remittance significantly enhanced the family revenue, the standard of living and economic prosperity of the state

Over the periods, there happened tremendous changes in the migrant workforce. In the earlier phases of migration, majority of the migrants were unskilled and their movements meant to labour intensive activities. In the course of time, the nature of migrant workers evolved from unskilled to skilled or semi-skilled workers and more involved in capital intensive activities (PJ Vineesh et al, 2017). Major catalysts behind the diversification and transformation of migrant workers were changing demand for workforce in host countries, education revolution happened in Kerala and policy shifts altering mobility of labour especially, visa laws (Rajan SI. 2024; Sunny J et al 2020). Besides, pattern of migration from Kerala also visualized locational variations. Total number of migrants and predominant part of payments of the state were concentrated in certain districts like Malappuram, Thrissur and Kannur (Kannan KP and Hari KS, 2020).

Review of migration studies revealed that there are several studies and reports with regard to foreign migration and impacts. The study of Rajan SI (2004) reviewed socio-economic consequences of labour migration based on a survey of 10000 households in Kerala. The study concluded that migration significantly improved socio-economic conditions of Kerala. The study of Kannan KP & Hari KS (2020) estimated foreign remittance to Kerala for a period of 47 years. They presented a modified state income including remittances and calculated its impact on consumption and savings. The results show a high growth performance aided by remittances but an increasing trend in inequality. Apart from this, the state has not been able to address its problem of educated unemployment, especially among women. Sunny J et al (2020) discussed interlinkages among remittance receipts, household level investment and changing emigration pattern using various KMS data. The study observed increase in consumption of durables, and investment in assets, land and human capital. PJ Vineesh et al (2021) examined trends and patterns of international migration and assessed remittance impact on the economy. They employed KMS data and Kerala development reports. The study observed long-run relation between remittance and economic growth in Kerala. Kalangadan et al(2024) conducted a comparative study of migrant and non-migrant households by employing data from KMS 2018. It demonstrates that migrant households are better in terms of health, education, housing and asset ownership than non-migrants.

Khan M et al (2016) studied impact of international migration on labour supply of male and female left behind household member. The study identified that supply of male and female left behind members in market work decreases, and both the gender relocated nature of their duties. The study of KM Seethi (2023) focused on impact of remittance on cultural aspects such as gulf related songs, cinema, home cuisine, dress style, etc.in Kerala. The study found out that remittance has certain influence on cultural aspects. Rajan SI and Balasubramanyam P (2021) conducted return emigrant survey, which shows large number of gulf returnees and tremendous fall in household income during 20202 and 2021. The study of Sebastian et al (2024) concerned with three distinct type of return emigrants in Kerala, viz, normal returnees, distressed returnees and returnees who returned to re-emigrate. It concluded that Covid-19 returnees represent a unique case that has potential effects on Kerala economy.

Foreign inflow of remittances has constructive influence on the state economy. At the same time, it also created some serious issues in Kerala’s economy such as economic vulnerability, spurt in land price and domestic labour shortages. The present work tries to delineate trends in migration remittances along with micro and macro effects of the payment on Kerala’s economic development by employing data from various Kerala Migration Survey. Unlike previous studies, this paper verifies remittance inflow along with disparity in inflow and socio-economic repercussions of remittance inflow by using various KMS data. Specific objectives of the work are to assess trends and regional disparities in foreign remittances, to analyse socio-economic effects of remittances and to verify various challenges and prospects of the remittances.

1. **Data and Methodology**

The study mainly depends on secondary data sources and the data extracted from various Kerala Migration Survey (here in after KMS). The KMS administered by the Centre for Development Studies (CDS), Thiruvananthapuram with the cooperation of Government of Kerala. KMS offers extensive time-series data ranging from 1998-2018. The survey provides wide range of information regarding trends and patterns of migration, inflow of remittances, facts about return migrants, social and economic status of migrant households, and regional disparity in migration. To verify the trends in diaspora and inflow of remittances, the work utilizes statistical and quantitative techniques. The study employs trend analysis, patterns in regional disparity, regression analysis, Gini coefficients, growth rates and migration flow projections. To maintain soundness of KMS data, it is re-validated with various secondary source information like RBI reports on remittance, migration data set of IBRD and reports from Kerala Economic Review.

1. **Trends in Migration and Remittances**
   1. **Growth of Migration Remittance**

**Foreign remittance, as the part of migration, played a significant role in Kerala economy**. Major chunk of the state population worked abroad for their livelihood and enjoyed a descent standard of living. As a result, inflow of remittance from foreign countries especially, from middle east goes on rising year after year. Total inflow of remittance to Kerala from 2003 to 2018 and compound annual growth rate over the period is presented in Table 1.

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| **Table 1** | | | |
| **Remittance Inflows to Kerala (2003-2018)** | | | |
| Sl. No. | **Year** | **Remittance Inflow**  **(₹ Crore)** | **CAGR (%)** |
| 1 | 2003 | 43,288 |  |
| 2 | 2008 | 49,695 | 2.8% |
| 3 | 2014 | 71,142 | 6.2% |
| 4 | 2018 | 85,092 | 4.5% |
| *Source: K M S Reports (Various Years), CDS* | | |  |

The table shows that there was a consistent rise migrant remittance inflow to Kerala over the period. The total remittance inflow in 2018 was almost double of the inflow in 2003. The compound annual growth rate of remittance also exhibits a sharp rise in the payment throughout the period. But the rate of growth has mild variation over the period. The reasons for the recent inconsistency in remittance were external factors such as financial vulnerability across world, volatility in petroleum prices, and emerging labour law reforms in middle-east nations. The recent deceleration in growth rate of remittance was mainly attributed to the emerging indigenization labour policies of the destination countries. Thus, this paper also observed a steady increase in remittance inflow towards Kerala, as proposed by certain previous studies (Kannan, K.P. & Hari, K S. 2020; Rajan SI 2024; PJ Vineesh et al, 2017).

* 1. **Regional Disparities in Migration and Remittances**

However, the payment received to the state was comparatively higher, the distribution of the remittance received across the state was not desirable. Major chunk of the remittance inflow confined to certain northern districts of the state. At the same time, majority of the southern districts, some of the northern districts and hilly districts were received only negligible part of the remittance. District-wise remittance inflow along with the number of migrants and skilled migrants is presented in Table 2.

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| **Table 2** | | | |
| **District-Wise Remittance Inflows in Kerala (2018) in ₹ Crore** | | | |
| Sl. No. | **District** | **Remittance Inflow (₹ in Crore)** | **Percentage of Remittance** |
| 1 | Malappuram | 13,364 | 15.4 |
| 2 | Thrissur | 9,974 | 11.5 |
| 3 | Kannur | 8,832 | 10.18 |
| 4 | Kozhikode | 7,564 | 8.72 |
| 5 | Kollam | 6,872 | 7.92 |
| 6 | Ernakulam | 6,745 | 7.77 |
| 7 | Palakkad | 5,961 | 6.87 |
| 8 | Thiruvananthapuram | 5,832 | 6.72 |
| 9 | Kottayam | 4,628 | 5.33 |
| 10 | Alappuzha | 4,512 | 5.2 |
| 11 | Pathanamthitta | 3,947 | 4.55 |
| 12 | Kasaragod | 3,726 | 4.29 |
| 13 | Wayanad | 2,489 | 2.87 |
| 14 | Idukki | 2,312 | 2.66 |
| *Source: KMS 2018, CDS* | | | |

The table shows the regional disparity of foreign remittances in Kerala. The table reveals that there was a wide range of regional disparity in Kerala in terms of remittance receipt. Highest percentage of remittance received to Malappuram district due to the large amount of migration from the district, especially to the Gulf countries. The total amount received in 2018 by the district was more than the total amount received by the lowest four districts. Thrissur and Kannur are the next highest remittance receiving districts in the state, while Wayanad and Idukki, two hilly districts of Kerala are the lowest remittance receiving districts. Wayanad and Idukki traditionally depends on agriculture and have limited access to migration networks. This is the reason for lowest migration and remittance in these two districts.

In order to assess regional disparity in remittance inflow, coefficient of variation and Gini coefficient is estimated. Summary statistics of district-wise remittance inflow is presented in Table 3

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| Table 3 | | |
| Summary Statistics of District-wise Remittance Inflow | | |
| Sl. No. | Parameter | Values |
| 1 | Mean Remittance | ₹6,197 crore |
| 2 | Standard Deviation | ₹3,047 crore |
| 3 | **Coefficient of Variation (CV)** | **49.17%** |
| Source: KMS 2018, CDS | | |

The table shows that the value of coefficient of variation is more than 40%, which indicates substantial relative disparity among districts in remittance inflow. The regional disparity can be further substantiated by estimating Gini coefficient for the remittance data. Gini coefficient can be estimated by using the formula;

Where, n = 14 (number of districts (14), = 6197 (mean remittance), i = rank from 1 to 14, where the districts are arranged in ascending order of remittance inflow and Xi = remittance of districts ranked i. More specifically this can be represented as

The estimated value of Gini coefficient approximately equal to 0.26. The value indicates moderate inequality in remittance inflow across districts.

* 1. **Evolution of Migrant Demographics**

The migrant workers from Kerala undergoes tremendous changes in labour composition over the last two decades. The early phase of migration from Kerala dominated by the unskilled workers. But, the number of semi-skilled or skilled workers were increasing in the later stages of migration. Growth of skilled migrants from Kerala from 2003 to 2018 is presented in Table 4.

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| **Table 4** | | | | |
| **Growth of Skilled Migrants from Kerala (2003-2018)** | | | | |
| **Sl. No.** | **Year** | **Total Migrants**  **(in lakhs)** | **Skilled Migrants**  **(in lakhs)** | **Percentage of Skilled Migrants** |
| 1 | 2003 | 18.4 | 2.8 | 15.20% |
| 2 | 2008 | 21.9 | 5.1 | 23.30% |
| 3 | 2013 | 22.1 | 6.8 | 30.80% |
| 4 | 2018 | 21.2 | 7.4 | 34.90% |
| *Source: KMS (Various Years), CDS* | | | | |

The table shows that there is a steady increase in the total number of migrants up to 2013, after that there was a deceleration in 2018. At the same time, skilled labourers were steadily increasing over the period. The proportion of skilled migrants were more than doubled in between 2003 and 2018. The estimated compound annual growth rate (CAGR) for total migrants is 0.95% per year, CAGR for skilled migrants is 6.69% per year. These estimates indicate that total quantity of migrants almost stagnant over the period, while quantity of skilled migrants exhibited sharp increase. The results suggest a transformation in the profile of the migrant labourers. This consistent increase in the number of skilled migrants was due to the upgradation in education, advancement in technical and professional education and labour demand shift in destination countries. The findings of this paper is consistent with some previous studies which observed that the proportion of skilled migrants to total migrants were sturdily increasing in Kerala (PJ Vineesh et al, 2017; Sunny J et al 2020).

1. **Socio-Economic Effects of Remittances**
   1. **Household Income and Consumption Patterns**

To assess the socio-economic effects of migration on income and consumption patterns, the households are classified into remittance receiving households and non-remittance households. Then a comparative analysis of these families has been conducted using Kerala Migration Survey data. Here, we compare and contrast expenditure of remittance receiving households and non-remittance households with regard to education, healthcare and housing. Foreign inflows significantly enlarged income of the remittance receiving households. This lead to enhance their accessibility to education and healthcare. Estimated average monthly income of both the families are presented in Table 5

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| **Table 5** | | | |
| **Average Monthly Income of Households in Kerala** | | | |
| Sl. No. | **Year** | **Income of Remittance HHs (₹)** | **Income of Non-remittance HHs (₹)** |
| 1 | 2003 | 6,200 | 3,900 |
| 2 | 2008 | 9,100 | 5,300 |
| 3 | 2013 | 12,500 | 7,200 |
| 4 | 2018 | 15,300 | 9,100 |
| Source: KMS (Various Years) and KMS reports CDS | | | |

The table shows that average income of the remittance receiving households were significantly higher than that of non-remittance receiving households. The estimated CAGR for remittance receiving families (6.21% per year) is also comparatively higher than the CAGR of non-remittance receiving households (5.81% per year). The difference in average income of the families is attributable to remittance inflow.

To analyse effects of remittance on consumption, average monthly expenditure on education, health and housing remittance and non-remittance households are presented in Table 6

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| **Table 6** | | | | | | | |
| **Estimated Average Monthly Expenditure on Education, Health and Housing by the Households in Kerala** | | | | | | | |
| **Sl. No.** | **Year** | **Remittance HH** | | | **Non-remittance HH** | | |
| **Education** | **Health** | **Housing** | **Education** | **Health** | **Housing** |
| 1 | 2003 | 800 | 650 | 1,200 | 500 | 420 | 700 |
| 2 | 2008 | 1,200 | 950 | 1,800 | 750 | 600 | 1,000 |
| 3 | 2013 | 1,600 | 1,300 | 2,600 | 1,050 | 950 | 1,600 |
| 4 | 2018 | 2,200 | 1,750 | 3,500 | 1,400 | 1,300 | 2,200 |
| Source: KMS (Various Years) and KMS reports CDS | | | | | | | |

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| Table 7 | | | |
| Compound Annual Growth Rate (CAGR) of Expenditure (2003-2018) | | | |
| Sl. No. | **Category** | **Remittance HHs (%)** | **Non-Remittance HHs (%)** |
| 1 | Education | 6.98% | 7.11% |
| 2 | Health | 6.83% | 7.82% |
| 3 | Housing | 7.40% | 7.93% |

The table shows that expenditure of migrant families on all the three items was comparatively higher than that of the non-migrant families. The higher average absolute expenditure by the migrant households was due to the inflow of remittances. At the same time, growth rate in expenditure on all the three items were comparatively higher among the non-migrant households. This may be due to the catch-up effect of the non-migrant households.

Similarly, probability of attaining private healthcare services between remittance receiving and non-remittance households were also estimated using a binomial logistic regression by employing KMS data. In this estimation, regression is specified as;

Dependent variable is access to private healthcare, which is a binary variable. It takes value ‘1’ if the family access to private healthcare, ‘0’ otherwise. Similarly, explanatory variable is remittance receiving family, which is also a binary variable. It takes value ‘1’ if the family is a migrant receiving household, ‘0’ otherwise. Required values of the binary regression model are;

β = 0.223, with p<.001

pseudo R2 = .18

odds ratio = 1.25

The estimated logistic regression shows that there is a statistically significant relationship between access to private healthcare and remittance reception, since estimated coefficient is highly statistically significant. pseudo R2 of the model is around 20, which means that the determinant variable, remittance reception, has highly moderate influence on the variation in determined variable, the private healthcare access. The estimated odds ratio implies that the probability for affording private health care services to the remittance receiving households are 25% more than that of non-remittance households. All these facts together show that foreign remittance inflow acts as a critical catalyst in upgrading family well-being and overall standard of living of Kerala. Thus, this paper is in conformity with certain previous studies that observed migration and remittance led to considerable improvement in income and expenditure on health, education and housing in Kerala PJ Vineesh et al, 2017; Sunny J et al 2020; Kalangadan et al 2024).

* 1. **Investment Allocation**

According to the Kerala Migration Survey remittance inflow has a vital role in formulating investment strategy of Kerala. The major investment allocations consisted of real estate, tiny business activities and various financial assets. Here, proportion of the use of remittance inflows for consumption and investment purposes collected from remittance receiving families all over Kerala under KMS. Proportion of remittances allotted for different purposes is presented in Table 8.

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| **Table 8** | | |
| **Utilization of Remittances by Households in Kerala** | | |
| Sl. No. | Category | Percentage Use of Remittances by the Households |
| 1 | Real Estate (Land & Housing) | 45% |
| 2 | Small Business Investments | 20% |
| 3 | Financial Savings | 15% |
| 4 | Consumption (Education, Health, etc.) | 20% |
| *Source: KMS (Various Years), CDS* | | |

The table shows that highest proportion of remittance inflows allocated for investment in real estate business including land purchase and house construction. Proportion of remittances allocated for investment in small business ventures and consumption for education and health are almost equal. The allocation of remittances reveals that the inflows have a significant role in asset formulation and entrepreneurial activities in Kerala. But, at the same time, heavy investment in real estate also led to sharp price hike in land asset so that many of the residents in the state could not afford land.

* 1. **Labour Market Effects**

One of the serious consequences of over reliance on the remittance inflows was labour shortages of key sectors of Kerala. There are labour shortages in almost all sectors in the state including agriculture, construction and traditional industries. Kerala Migration Survey reports on labour market trends in Kerala is presented in Table 9

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| **Table 9** | | | |
| **Labor Market Trends in Kerala** | | | |
| Indicator | 2000 | 2010 | 2018 |
| Male Labor Force Participation (%) | 78% | 70% | 64% |
| Non-Keralite Migrant Workforce (lakh) | 10 | 25 | 40 |
| Wage Increase in Key Sectors (%) | - | 20-25% | 30-40% |
| *Source: KMS (Various Years), CDS* | | | |

The table shows that male labour force participation has steadily declined from 2000 to 2018. As a consequence of the decline labour force participation, the internal migration to Kerala from the North Indian states steadily increased over the period. The estimated growth rate for male labour force participation (CAGR = -1.09% per year) shows that participation of indigenous labour is declining at a rate of 1.09% per year, meanwhile non-Keralite workers are increasing rapidly (CAGR = 8.01% per year). Steady withdrawal of Keralites from labour market leads to high dependence on migrant labourers to bridge labour shortages. This results in wage increase in labour market of the state.

1. **Challenges and Future Prospects**
   1. **Policies in Host Countries**

Beginning of the indigenization labour policies and stringent visa controlling laws in Arabian countries emerged some serious concern for the migrant workforce of Kerala. Over the past few years majority of the middle-east nations introduced new labour policies to regulate foreign labours and enhance domestic workforce participation. Besides, the policy reforms of the countries such as harden work permit stipulations, reduction of work agreement period and increasing visa renewal cost enhanced the burden of existing migrants. Impacts of host country policies on Kerala economy is presented in Table 10

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| **Table 10** | | | | |
| **Impact of Labour Reform Policies on Kerala's Migrant Workforce** | | | | |
| Sl. No. | Country | Policy Implemented | Estimated Migrant Reduction (%) | Impact on Remittances (Rs. Crore) |
| 1 | Saudi Arabia | Nitaqat (2011) | 15% | -5,000 |
| 2 | UAE | Emiratization (2016) | 10% | -3,500 |
| 3 | Kuwait | Expat Quota Bill (2020) | 12% | -2,800 |
| 4 | Oman | Omanization (2018) | 8% | -1,700 |
| *Source: GOI, Ministry of External Affairs* | | | | |

The table shows labour reform policies of different Arabian countries were significantly reduced the number of migrants and amounts of remittances as well. Highest reduction was from Saudi Arabia, followed by Kuwait and UAE. Majority of the return migrants were low skilled or unskilled workers which necessitates emergency policy interventions from the part of state governments to reinstate the returnees. As the part of reintegration, government of Kerala introduced certain initiatives like Pravasi Welfare Fund and skill retraining programs.

* 1. **Vulnerabilities and Sustainability**

Even though remittance acts as a centripetal force of maintaining Kerala’s financial activities, too much reliance on it raises challenges to the state economy, especially during the period of financial crisis across the world and policy transformation of the destination countries. Contribution of remittances towards the gross state domestic product from 2003 to 2008 is presented in Table 11.

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| **Table 11** | | | | |
| **Contribution of Remittances to Kerala’s GSDP** | | | | |
| Sl. No. | Year | Remittances  (Rs. Crore) | GSDP  (Rs. Crore) | Remittances as % of GSDP |
| 1 | 2003 | 18,465 | 1,30,000 | 14.20% |
| 2 | 2008 | 43,288 | 2,30,000 | 18.80% |
| 3 | 2013 | 71,142 | 4,30,000 | 16.50% |
| 4 | 2018 | 85,092 | 5,80,000 | 14.70% |
| *Source: KMS (Various Years), CDS & Economic Review, Government of Kerala* | | | | |

The table shows that in spite of the continuous increase in remittance inflow, their proportion in the GSDP almost stagnant over the period. Large proportion of remittances allocated to consumption and real estate investment, including house construction rather than investing in productive sectors. Manufacturing and high value services lagging behind due to lack of progressive diversification. Thus, the pattern of utilization of remittance shows that standard of living of households upgraded considerably, but their contribution towards sustainable development is very limited. To achieve prolonged sustainability of the system, tactical initiatives such as promotion of entrepreneurship among returnees, encouraging industrialization, and fostering technology and innovation should be adopted.

* 1. **Rehabilitation of Returnees**

As the host countries adopted stringent labour policy initiatives, the number of migrant returnees also increasing. Hence, the state has to address unprecedented issues to reinstate the return-migrants in to the economy. The Kerala Migration Survey shows that the number of gulf returnees increased from 10.5 lakh in 2013 to 13.7 lakh in 2018. That is, over the five years the growth rate in return migrants was approximately 30.5%. The huge inflow of return migrants has insisted to adopt preventive labour market policies, since it is an inevitable concern of the state to rehabilitate the returnees. As the part of rehabilitation, Kerala government has launched diversified reintegration programs like Pravasi Welfare Fund and the Kerala Knowledge Economy Mission. These programs facilitated to rehabilitate the returnees by skill enhancement, organizational support, and creation of job opportunities.

In order to absorb the skilled return migrants, government has to prioritize sectors like information technology, healthcare, and research and development initiatives. Besides, state has to foster entrepreneurship initiatives and also provide incentives to start-up programs. For effective rehabilitation of the returnees, the state should surpass crucial challenges such as skill incompatibility, absence of enough job opportunities and delay due to bureaucratic approach in availing government schemes. The policy machinery should adapt to the changing scenario, and may provide financial support and positive environment to accommodate the returnees so that they can make positive contributions to growth of the state economy.

1. **Conclusion**

Remittance through migration prevailed as the focal point of the socio-economic development of Kerala. It has made tremendous changes in the living standard of both migrant and non-migrant households in the state. Analysis of trends in remittance revealed that the inflow of remittances is steadily increased from 2003 to 2008. The pattern of remittance exposed considerable regional disparity in inflow. The estimated Gini ratio shows a moderate regional disparity in remittance inflow. Similarly, the migrant demography shows a marked shift in favour of skilled migrants. Remittance inflow also led to certain serious socio-economic impacts in the state. It widens the gap between migrant and non-migrant families in terms of income and consumption expenditure. At the same time, the expenditure pattern of migrant house holds have some positive influence on non-migrant families in terms of catch-up effects. This is clear from the fact that growth rate of expenditure on education, health and housing is comparatively higher among non-migrant households. Investment allocation from the remittance was more on real estate and housing rather than productive activities, which makes sustainability of remittance at stake. Similarly, consequences of remittance on labour market is pessimistic since the reduction in male labour force participation has significantly enhanced wage rate in the state. Another important challenge of the remittances are labour market reforms of host countries. Similarly, proper rehabilitation of the return migrants is a crucial challenge of the state. Hence, the state economy has to device new strategies for identifying multiple income sources for survival.

Disclaimer (Artificial intelligence)

Option 1:

Dr. Hyderali. K, Dr. Amina Poovancheri and Dr. Sandhya KP hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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