

**SUMMARY ON ASIA’S SOCIAL INFRASTRUCTURE DEMAND ESTIMATE:
THE CASE STUDY OF THAILAND**

**“Bridging the Infrastructure Gap in Asia” ADB-JICA Joint Side Event
at the 50th Annual Meeting of the ADB Board of Governors**

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This paper is presented to the ADB-JICA joint seminar in Yokohama on May5, 2017 on the occasion of ADB’s Annual Meeting. The copyright to this paper belongs to the authors. The views expressed in this paper are those of the authors and do not necessarily represent the official positions of JICA.

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Population change was driven population policy since 1970 which applied a ‘Family Planning Program’ as main policy instrument. The family planning measure has been effective to reduce TFR (Total Fertility Rate)¹ has reduced from 6.3 in 1965 before introduced a family planning measure to be 1.6 person in 2010 respectively. Thai National population projection is quite stable at 64-66.4 million persons in the next 30 years, the population with age 65 year, approximately 9 percent of total population in 2553 will increase to 14 percent in 2021, and 20 percent in 2031 respectively. In addition, it is clear also that within the next 30 years most of population will reside in the urban area.

The changing population trend has called in a policy to increase population quality rather than numbers by a family planning program. In order to shift economic structure away from labor-intensive towards an improvement of labor quality and productivity², immigration of unskilled-skilled labor policy. More importantly, population policy has turned to human security, equitable income distribution³ as well as gender gap, and raising quality of life for aged population.

ADB estimated the demand of Asia’s economic infrastructure (power, water and sanitation, transport and telecommunication) from 2010 to 2020, which costs 8 trillion USD approximately, in a report “Infrastructure for a Seamless Asia” in 2009. JICA has agreed with ADB to conduct a research on an estimate for Asia’s social infrastructure demand for the same period from 2016 to 2030 to complement ADB’s demand estimate for economic infrastructure. Social infrastructure, such as schools and hospitals, is key capital investment to maintain social services and secure economic development of the region where the population is expected increase. The financial impact of the investment to public finance of each country would be also enormous.

The purpose of this research is 1) to estimate the investment demand of Asia’s social infrastructure up to 2030 by two estimate methodologies namely a ‘Micro’ and ‘Macro’ approach. The research team has developed model for social infrastructure needs.

The demand for schooling, low cost housing, and health care services, and government buildings are designed as follows:

¹ Number of average children at birth per a fertile mother

² Measured by Total Factor Productivity (TFP)

³ Measured by ‘Gini’s Coefficients

1) Under the trend of population change in Thailand, household demand for education given ‘enrollment ratios assumption’, the NESDB (2013)⁴ has projected number of students from the *supply-side*. As Thailand is trying to escape from a Middle Income Trap syndrome, key determinants would be both physical as well as human capital development. The equilibrium ‘enrollment ratios’ is simulated to project the demand for labor by skills (occupation-education) by sector of production. The demand for labor by education was later translated into the demand for schooling by disciplines investment.

2) The demand for health care services and hospital facilities and physicians and other human resources depends on the aging structure of population. The model would predict the number of patient of non-communicable (NCD) and other patients. The translations of demand for health services into physical infrastructure and cost effective investment will be done by our designed model.

3) The housing need and affordability of low-middle income in Thailand has been main government policy. It is officially serviced by the National Housing Authority of Thailand. Middle-high income housing demand has been taken care by private housing market at large. In our study, we applied SES data base to estimate the demand for housing by income class. Some income class will be able to afford only ‘rent-a-house’ rather than mortgage.

The demand for housing for aged citizen may need new vision how to apply new technology for the amenity of aged people and how to design community for senior-new breed family living nearby in the same community.

4) The soft infrastructure demand for government building will be estimated by applying data base on how the social capital stock (the case of government building) is estimated by NESDB. We will apply a model starting from population resettlement under dimension of ‘Urban-Rural’.

A. Social Infrastructure Needs Assessment

In our study, we have applied an econometric model to forecast the growth scenario of Thailand 2016-2030. The model has taken into account the policy inclusion of demand driven human capital development in Thailand. The rising demand for skills labor is key determinant to our growth on the coming decades.

Table 1 Base Line Scenario Forecast for Thailand 2016-2030.

<i>Year</i>	<i>Population (Thousand person)</i>	<i>GDP in current price Million USD</i>	<i>GDP per capita USD</i>	<i>GDP Growth in constant price %</i>
2016	67,454.69	407,960.00	6,047.91	2.99

⁴ Single year age population is applied.

2020	68,127.78	493,902.92	7,249.65	3.09
2025	68,502.23	639,170.02	9,330.65	3.58
2030	68,305.84	848,921.12	12,428.24	4.15
2016-2030	Average growth rate 0.084 % p.a.	Average growth rate 7.20 % p.a.	Average growth rate 7.03 % p.a.	Average growth rate 3.43%

Over the forecasting horizon 2016-2030, Thailand would be able to pick up depressed economic growth potential with average GDP growth rate of 3.43 percent p.a. Here, the per capita GDP will increase from 6,047.91 USD per person to 12,428.24 USD per person in 2030, given the population growth of 0.084 percent per year. The demand for social infrastructure would be significant issue in Thailand to reach the assumed growth target.

Social Infrastructure Demand for Schooling

1) The growth potential of Thailand in next decades would need to raise skills human capital by 1-1.5 percent during 2015-2030 while lowering the demand for unskilled labor respectively. The increase of human capital intensity is consistent with the GDP growth rates and GDP per capita. The assumption of enrollment ratios in this study is demand driven projection and consistent with the projection of human capital needs of skills labor over the horizon. The projected number of students signifying the social infrastructure needs of education and human capital investment as follows.

Table 2 Demand driven projection of Social Infrastructure Need: Education

year	GDP growth rates, % p.a.	GDP per capita (USD)	Enrollment Ratios, %			No. of Students (million persons)		
			Prim.	Second	Tertiary	Primary	Secondary	Tertiary
2016	2.9	6,047	99.74	89.10	80.13	4.64	2.92	4.62
2020	3.0	7,249	99.80	89.52	81.77	4.45	2.86	4.32
2025	3.5	9,330	99.89	90.11	84.14	4.29	2.69	4.04
2030	4.1	12,428	99.99	90.78	86.92	4.01	2.57	3.93
2035	3.8	11,061	100.10	91.54	90.18	3.70	2.59	3.72
2040	4.1	13,758	100.23	92.40	93.98	3.36	2.52	3.47

Social Infrastructure Demand for Low-Income Housing

Econometric estimates have found the following results:

- 1) The increase size of household would lead to lower tendency to rent a house for entire country, municipal area, and Bangkok area and vicinities.
- 2) The wealthier a household becomes they would likely to shift to purchase houses instead of

renting houses especially for who lives in Bangkok and cities area. When age of household head increases, person will have higher tendency to own a house. As people are gaining in age they accumulate assets and becoming wealthier. Thus, afford higher house price.

3) The low income household is those belong to the percentile 25. In order to assist the low-income household to purchase houses with 22-30 square meters, government may need to assist or subsidies such as reducing interest rates for home loan, and assisting construction costs. The affordable house price is THB 650,000 baht. A mortgage payment of 4,500 baht per month with 7% interest charge for 30 years payment is big burden for household with a monthly income of 15,000 baht.

4) The low income housing 10 years (2016-2026) development plan by NHA in cooperation with related organization in private sector and government sector for 1,707,437 household with budget for implement of 716,599.54 million baths or 21.391 billion USD (at current exchange rate of 33.5 baht per USD) or 2.139 billion USD per year. The investment plan consists of 4 categories:

(1) Quality of life improvement plan (rental) of 3-5 floors residential area, one bedroom with 28-32 square meters 91,657 units in Bangkok and perimeter area 45,359 units and in rural area 46,298 units. The ground floor of the building is 'Universal' design for the elder and handicapped.

(2) Strengthening the housing security plan (hire purchase) in amount of 421,034 units in the Bangkok and perimeter (condominium with 4-35 floors) 161,248 units and rural area (single house double house townhouse and condominium) 259,786 units.

(3) Government officer housing project in amount of 55,000 units in format of house for government officer in amount of 30,000 units and official residence in amount of 25,000 units.

(4) CODI in cooperation with the local government for the low income in amount of 1,044,510 units consists of Housing for the slum dwellers and urban low income in amount of 692,725.84 household.

Social Infrastructure Demand for Health Services

The study has found that 'patient bed- population ratio' in Thailand was still far from the OECD's level. Hospital in Thailand is equipped with 122,470 beds (1.9:1,000 populations) in public hospital. If the number of bed is added with private hospital of 34,602 beds, it is equivalent to 2.4:1,000 populations. This is much lower than developed countries such as Japan is 7.9:1,000 populations and South Korea of 6.4:1,000 populations respectively. Given the population projection 2016-2040 we have estimated the cost of investment of health services in terms of beds equivalent. In order to catch up with South Korea in 2040, Thailand has to invest 10,399 and 15,392 beds in 2030 and 2040 respectively. The investment cost is projected to be 51,993 and 76,962 million baht. It is equivalent to

Table 3 Social Infrastructure Needs: Health Services

year	No. beds (stock)	Ratio of bed per 10,000 population	New investment (beds)	Estimated cost of investment (million baht)	Valuation at current exchange rate of 33.5 baht per USD (in billion USD)
2016	156,128	23.90	6,005	30,025	0.900
2020	182,648	27.68	7,025	35,125	1.053
2025	222,219	33.48	8,547	42,734	1.232
2030	270,363	40.86	10,399	51,993	1.552
2035	328,938	50.33	12,651	63,257	1.896
2040	400,203	62.66	15,392	76,962	2.307

Note: 1) assuming constant cost investment over the horizon of 5 million baht per bed.

B. Cost of Social Infrastructure Investment

In order to surpass the “Middle Income Trap” Syndrome, productivity upgrading and human capital development would play significant role in the coming 15 years. Thailand needs intensive and continuous investment in social infrastructure in both of quantity and quality aspects. The total cost of social infrastructure investment in Thailand for 2016-2030 is estimated to be 84.083 billion USD or equivalently 0.94 percent of GDP. It is 82.11 USD per person on average during the forecasting horizon.

Investment in low-income housing comprising for ownership, rental house or provision a living in slump area of urban city shares quite a large proportion of social infrastructure need. The estimated investment requirement is as much as 47.25 billion USD or 0.53% of average GDP in current price.

The demand driven of gross enrollment is consistent with the human capital investment of skills labor over the horizon. Thus, the rates would be declined overtime as result of decrease population growth. The structural change has however changed over the period. That is to say, enrollment of primary students would likely to decrease rapidly. On the contrary, students in secondary and tertiary or university level would need to be increased. Especially, the social investment in skills formation education of Science and Technology would need to be increased substantially. The estimated cost of investment in changing education structure is estimated 18.88 billion USD or 0.21 percent of GDP. This is inclusive of only new buildings alone. If we include the demand for facilities, learning-teaching materials this could be further scaled up.

For public health in Thailand, under an “Aging Scenario”, even though Thailand is well known for medical-services under the universal health care system, but there are still large gap for rural and urban services provision in the aging scenarios. Thailand is still lacking of advance facilities for non-communicable (NCD) in urban cities while rural household has still face needs accessibility and sufficient medical quality.

The estimation here did not taken into account the need for human resources such as medical

doctors, nurses in rural area, and helper for elderly persons in coming decades. The cost of social infrastructure investment is estimated at least 17.94 billion USD or 0.20 percent of annual GDP.

Table 4 Estimated Social Infrastructure Needs for Thailand 2016-2030.

Year	Schools (Million USD, %)		Hospitals (Million USD, %)		Housing (Million USD, %)		Government bldg. (Million USD, %)		Total Cost (Million USD, %)		Per Capita (USD/person)
	Amount	% of GDP	Amount	% of GDP	Amount	% of GDP	Amount	% of GDP	Amount	% of GDP	
2016	660.02	0.16	896.26	0.22	2,138.29	0.52	14.36	0.0035	3,694.56	0.91	54.77
2020	971.55	0.20	1,048.49	0.21	2,578.05	0.52	11.44	0.0023	4,598.10	1.00	67.49
2021	1,045.27	0.20	1,090.43	0.21	2,713.34	0.52	10.72	0.0021	4,849.04	1.02	71.05
2022	1,122.57	0.21	1,134.05	0.21	2,860.48	0.52	9.73	0.0018	5,117.10	1.05	74.87
2023	1,204.90	0.21	1,179.41	0.21	3,020.29	0.53	8.74	0.0015	5,404.60	1.07	78.99
2024	1,293.48	0.21	1,226.59	0.20	3,193.70	0.53	7.76	0.0013	5,713.77	1.09	83.45
2025	1,389.42	0.22	1,275.65	0.20	3,381.78	0.53	6.76	0.0011	6,046.86	1.12	88.27
2030	2,019.87	0.24	1,552.03	0.18	4,590.55	0.54	1.53	0.0002	8,162.44	1.24	119.50
2016-2030	18,884.80	0.21	17,946.27	0.20	47,252.39	0.53	126.54	0.001	84,083.47	0.94	82.11