Socio-Economic Impact Assessment of Net Pracharat

Desk Report

Yong Yoon
Chulalongkorn University

Introduction

The **Village Broadband Internet project** or **Net Pracharat** is a flagship national digital infrastructure development project that aims to **strengthen the broadband network** across the country by establishing high-speed Internet access in every village, especially in rural and remote areas.

Main Stakeholders

Cabinet of Thailand approval (**Dec. 2016**).

Initial Phase

Installed 99 Villages — Jan 17
Installed 3,369 Villages — May 17
Installed 6,761 Villages — Jun 17
Installed 11,250 Villages — Jul 17
Installed 15,114 Villages — Aug 17
Installed 18,916 Villages — Sep 17
Installed 19,965 Villages — Oct 17
Installed 21,606 Villages — Nov 17
Installed 24,700 Villages — Dec 17

Northern 4,416 Villages
Northeastern 13,468 Villages
Central 3,719 Villages
Southern 3,097 Villages

An initial capital expenditure of **$318 million USD** for the network deployment and installation of Wi-Fi hotspots was funded through the national budget of the government.

MDES and ToT Public Company completed the **installation of the fibre optic cable networks and free public Wi-Fi hotspots** (one per village) strategically located in public areas and buildings (e.g. schools and temples), with speeds of up to 30/10 Mbps to increase accessibility in **24,700** target rural villages by December 2017.

Net Pracharat Project Target Area

Total 74,987 villages* (100%)			
30,635 villages 🟨 (41%)		44,352 villages (59%)	
Zone A Urban Area	Zone B Suburban Area	Zone C Rural Area 40,432 villages	Zone C+ Border Area 3,920 villages
Commercial Area		Non-Commercial Area	
Non-Target Area		🟦 MDES (24,700) 🟩 NBTC (15,732)	🟥 NBTC (3,920)
		Fiber Optic	Fiber Optic Satellite

Note* Number of total villages referred from NTBC's GIS map (Feb 1st, 2017)

Total 74,987 villages
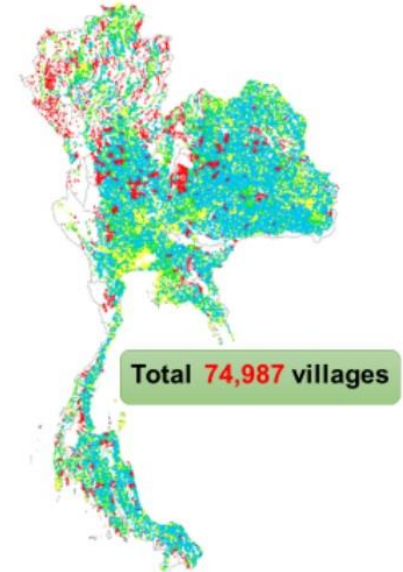
Steady Progress

Phase 2
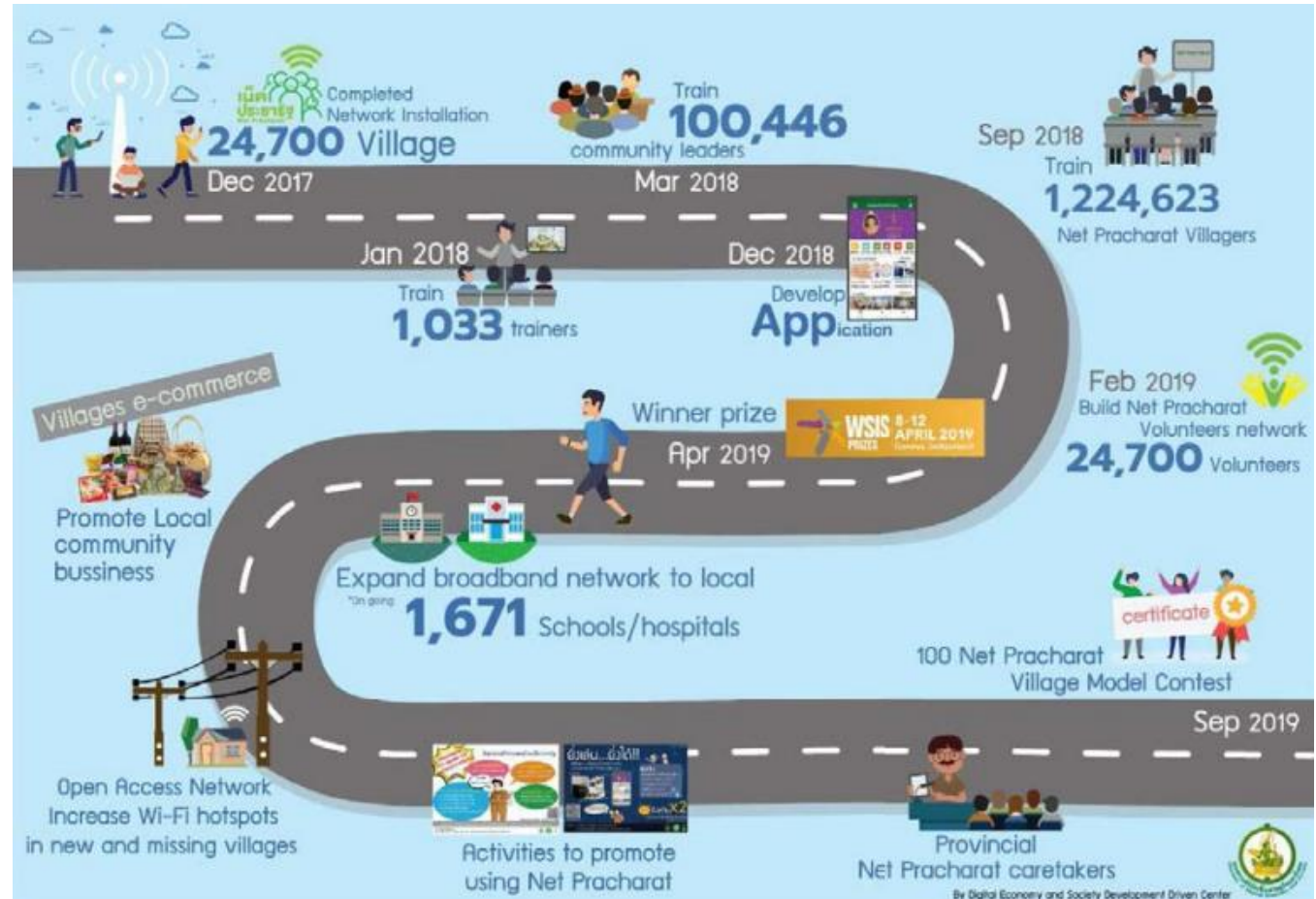
Registered Users (2019)

ปริมาณการใช้งานประจำปี พ.ศ. 2561

สถิติการใช้งาน Wi-Fi เน็ตประชารัฐ

จำนวนผู้ลงทะเบียนสะสม
4,537,348 คน

จำนวนอุปกรณ์สะสม
5,690,195 เครื่อง

ม.ค	ก.พ.	มี.ค.	เม.ย.	พ.ค.	มิ.ย.	ก.ค.	ส.ค.	ก.ย.	ต.ค.	พ.ย.	ธ.ค.
3,517,297	2,020,354	2,188,765	2,216,633	1,059,580	1,824,011	3,139,558	2,366,326	3,153,019	2,549,881	1,818,503	1,717,940

การเข้าใช้งาน (ครั้ง)　　อุปกรณ์ที่เข้าใช้งาน (เครื่อง)
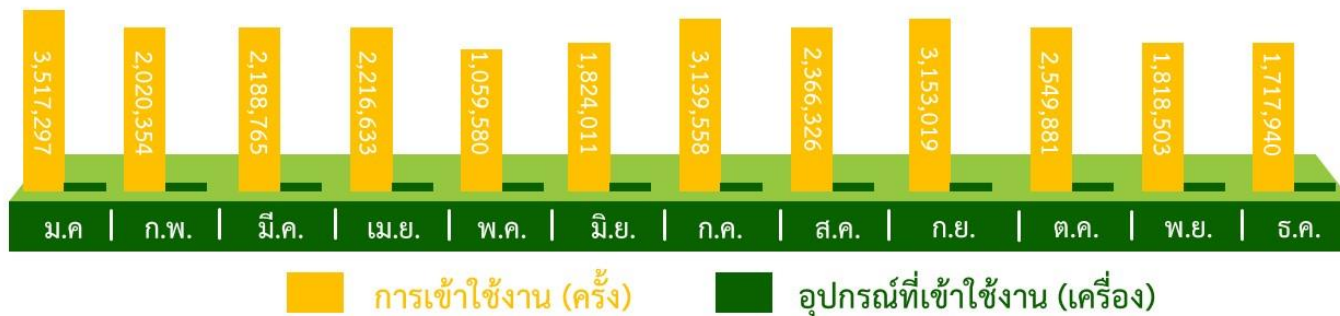
Registered Users (2020)

ปริมาณการใช้งานประจำปี พ.ศ. 2562

สถิติการใช้งาน Wi-Fi เน็ตประชารัฐ

จำนวนผู้ลงทะเบียนสะสม
7,500,426 คน

จำนวนอุปกรณ์สะสม
8,895,362 เครื่อง
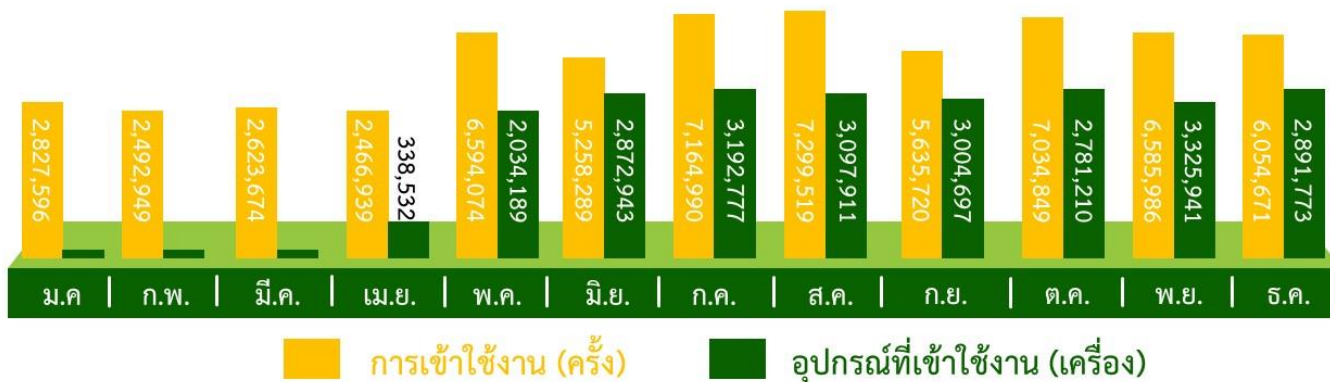
เดือน	การเข้าใช้งาน (ครั้ง)	อุปกรณ์ที่เข้าใช้งาน (เครื่อง)
ม.ค	2,827,596	
ก.พ.	2,492,949	
มี.ค.	2,623,674	
เม.ย.	2,466,939	338,532
พ.ค.	6,594,074	2,034,189
มิ.ย.	5,258,289	2,872,943
ก.ค.	7,164,990	3,192,777
ส.ค.	7,299,519	3,097,911
ก.ย.	5,635,720	3,004,697
ต.ค.	7,034,849	2,781,210
พ.ย.	6,585,986	3,325,941
ธ.ค.	6,054,671	2,891,773

การเข้าใช้งาน (ครั้ง)   อุปกรณ์ที่เข้าใช้งาน (เครื่อง)

Registered Users (2021)
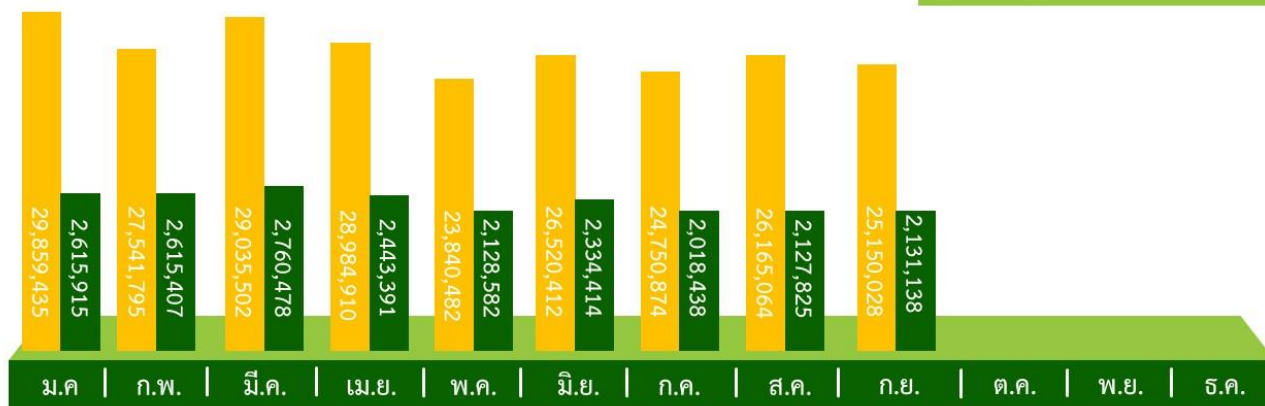
Objectives

The **Net Pracharat** project aims at **strengthening National Broadband Network** by expanding high-speed Internet networks to reach every village in the country, thereby resulting in bridging the digital divide and building an **inclusive and sustainable connected society**.

Aims of Net Pracharat Project

In line with "Thailand 4.0" the Net Pracharat Project aims at:

- **Developing high-speed internet networks** via FTTX in each of the targeted villages and efficiently support its future network expansion.
- Provide **free high-speed internet** to people in remote areas to **reduce inequality** and provide **equal access** to government services.
- **Increase the economic and social potential** of target villages to advance careers, incomes, education, public health, agriculture, online-trading and other opportunities.

(*ref*: APT, pg. 15)

Net Precharat aims to impact and transform society, economy, health and education.

Previous studies/reports

(June 2021) **Chiang Mai University**, รายงานผลการศึกษาเบื้องต้น(inception) report

MDES, Digital Economy and Society Development Driven Center, The Internet Use of Net Pracharat Villages Report: January to June 2020

(August 2019) **Asia-Pacific Telecommunity (APT) Report** on Best Practice of Connectivity: Village Broadband Internet Project (Net Pracharat) of Thailand

Micro-data provided by Survey by **NSO**: (Survey of people's opinions towards the Pracharat Internet Project 2018)

NSO (2018)

In July-September 2018, NSO with MDES conduct a field survey to collect villagers' opinions and satisfaction toward Net Pracharat.

NSO interviewed 2,577,231 local people in the 24,700 Net Pracharat villages.

More than 73% of participants recognized benefits of high-speed Internet networks.

Local people expressed that Net Pracharat helped enhance quality of life for local villagers, provide opportunities for earning a living, generate income supplement, and facilitate the search for useful information related to health, agriculture, and education.

However, more than 86% thought that more numbers of public Wi-Fi hotspots should be installed throughout their villages.

Correlation matrix (NSO 2019)

	useNP	female	age	education	Internet access	central	north	northeast	south	training	useful
useNP	1.00										
Female	-0.04	1.00									
Age	-0.17	-0.02	1.00								
education	0.08	0.01	-0.39	1.00							
Internet access	0.13	0.01	-0.14	0.17	1.00						
Central	-0.04	-0.01	0.02	0.04	0.08	1.00					
North	-0.02	0.00	0.05	-0.04	0.04	-0.19	1.00				
northeast	0.06	0.01	-0.04	-0.04	-0.13	-0.48	-0.52	1.00			
South	-0.03	0.00	-0.02	0.06	0.07	-0.15	-0.16	-0.41	1.00		
Training	0.35	-0.01	0.04	-0.01	0.09	-0.01	0.00	0.03	-0.03	1.00	
Useful	0.17	0.00	-0.06	0.05	0.11	-0.05	0.00	0.06	-0.04	0.15	1.00

Author's calculation

Logistic regression (NSO 2019)

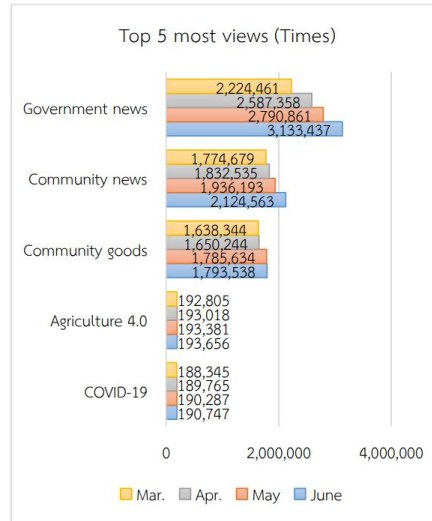| useNP	Coef.	Robust Std. Err.	z
female	-0.22	0.00	-54.49
age	-0.15	0.00	-183.70
education	0.01	0.00	8.15
Internet access	0.40	0.00	92.13
north	0.11	0.01	15.90
northeast	0.29	0.01	49.19
south	0.04	0.01	5.62
training	1.63	0.00	365.69
useful	0.80	0.01	120.71
constant	-0.84	0.01	-63.80

Author's calculation

where "useNP" is dummy variable 1 for using Net Precharat Internet (0 otherwise), "female" is 1 for female and 0 male, "age" is age groups (every 5 years), "education" is a 10 group education category, "Internet access" is 1 if have internet access and 0 otherwise, and regions are "central", "north", "northeast" and "south", "training" is 1 if received training for Net Precharat (0 otherwise) and lastly "useful" is 1 if they thought Net Precharat was useful and 0 otherwise.

Previous studies/reports

Internet Use of Net Precharat (Jan - June 2020)

From Jan-June 2020, according to MDES, internet traffic averaged between 5 to 6,000 GB per month with an estimate of 2-3 million devices connected. Most of the internet traffic were directed to **Facebook** (68,824,805 views/ day)

followed by **Google** and

Youtube (10,315,362 views/day and 9,077,420 views/ day).

Chart 13 Top 5 most views from March to June 2020

Top 5 most views (Times)

Category	Mar.	Apr.	May	June
Government news	2,224,461	2,587,358	2,790,861	3,133,437
Community news	1,774,679	1,832,535	1,936,193	2,124,563
Community goods	1,638,344	1,650,244	1,785,634	1,793,538
Agriculture 4.0	192,805	193,018	193,381	193,656
COVID-19	188,345	189,765	190,287	190,747

Mar. Apr. May June

Number of internet connection devices by location of NPCR internet installation

June: 794, 160,871, 607,375, 81,217, 557,284, 1,413,268
May: 742, 108,937, 449,387, 60,442, 438,783, 1,260,959
Apr.: 538, 94,205, 395,911, 52,967, 388,568, 1,117,782
Mar.: 817, 116,988, 486,889, 73,004, 468,570, 1,372,588
Feb.: 707, 138,175, 549,646, 82,464, 511,009, 1,436,236
Jan.: 784, 137,197, 559,564, 86,561, 540,569, 1,601,426

Not specify — Others — Center Hall — Temple — Headman's office — Community Hall
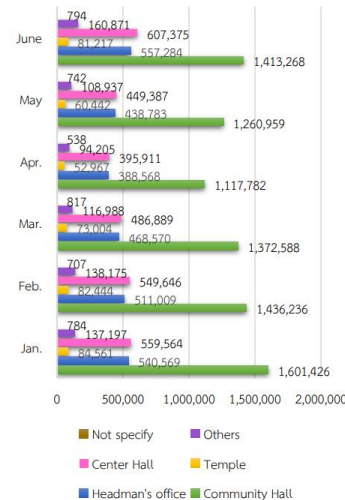
Chart 7 Internet traffic by main occupation of NPCR villages across country from January to June 2020[1/ 2/]

Internet traffic (MB)

Rice farmer — Orchardist — Rubber planter — Crop farmer — General contract worker
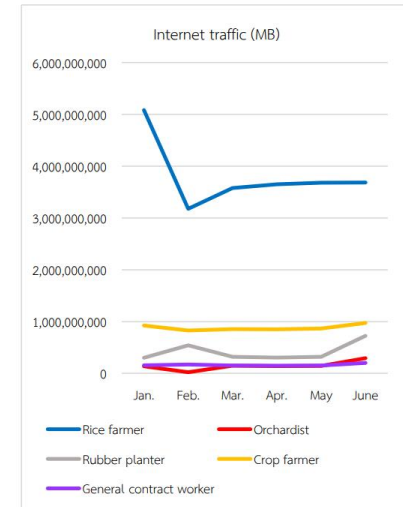
CMU inception report 2021 (2564)

By May 2021, surveyed 1,598 villages (of which 820 villages were equipped with high-speed internet of the Pracharat internet project).

Those **not using** were (64.4% female;, 48.9% above 40 years of age; mostly farmers; 67.9% earned income < baht 10K p.m.); About 84% (79.4%) had never used the Internet before (Net Precharat installment); Those not using Net Precharat use mobile internet (65.8%) and fixed-lines (37.6%).

Reason for not using Net Precharat services range from not accessible, far from installation point, to poor signal.

Quantitative Method used in the CMU study:
- Social Accounting Matrix (SAM) & Computable General Equilibrium model (CGE)
- Social Return on Investment (SROI)
- Structural Equation Model (SEM)

Reason for use of Net Pracharat

- (60.2%) Proximity to installation point (esp. schools)
- (41.4%) Good, fast and consistent signal
- (38.9%) Public events, village funds, meeting in city hall, etc
- (35.9%) Use for entertainment (online games, music, movies, etc)
- (20.4%) Social media, VDO calls, SMS

Opinion:

- While (12.8%) say that Net Pracharat was useful for learning and education.
- High scores were registered for convenient, free, easy to use, register for public services (esp. during Covid-19), help create opportunities, help reduce digital divide by improving digital literacy and media, access to news, etc.
- Moderate scores for helping to be closer to friends, relatives, creating digital content and revenue generation fro publishing on the internet, etc. and very low scores for potential to provide new way of life/values, and make meaningful impact in future lives
- Problems remain in distinguishing true and fake information.
- Internet access still a problem in areas esp. Northeast region of Thailand.

Effectiveness Assessment

1. **Access to telecommunications services**: Vast majority of Internet users are students (2/3)

2. **Access to information (equally)**: High scores for helping to enhance careers, income, education, access to public health, agriculture and online trading. Moderate scores for stimulating ideas for solving problems in new ways or the creation of new ideas.

3. **Reducing the digital divide**: 78-80% in remote/marginal areas use Net Precharat services (of which 15-18% rely solely on Net Precharat for Internet access).

4. **USO Net service (access in remote/marginal areas)**: High scores for convenience, free access, access to government services, information, etc.

The CMU study further calculates **Net Present Value (NPV)** and the **Benefit-Cost Ratio (B/C Ratio)** (by considering only economic benefits) and concludes that there is **no** positive payback on investment as of June 2021. However this is to be expected, since the project is not designed for profit.

The **Internal Rate of Return (IRR)** was calculated to be 62.04% (for the case when positive NPV are expected, i.e., when there are Net Pracharat users exceeding 600,000 persons/day).

Cost-effective analysis was also carried out which employed 4 further indicators: New Users Per Investment (NUPI), Better Quality Per Investment (BQPI), Total Access Per Investment (TAPI), and Digital Divide Alleviation (DDA).

Social Accounting Matrix (SAM) & Computable General Equilibrium (CGE) simulation

Overall the SAM and CGE point to **positive** economic impact of Net Pracharat and USO projects.

The SAM and CGE measure (1) the total effect from investment (direct, indirect, induced), (2) benefits on the economic sector, (3) benefits on households from income distribution, (4) nominal/real GDP growth rate and value, and (5) benefits from tax collection.

Direct benefits were estimated at Baht 1.36 mil. (indirect effects were 4 times larger than direct effects); lowest income groups would benefit 40% increase in incomes; Net Pracharat contributes 1.81 % to nominal GDP; additional direct tax collection of Baht 45,610 million Baht, etc.

Social Return on Investment (SROI) method

In addition, the SROI, by considering social returns in addition to economic benefits, finds that with 400,000 users per day, capital payback period would be reached by 2022 (c.f for ROI, 1.07 mil. users are required).

Structural Equation Modelling (SEM)

Further impact of Net Precharat and USO were confirmed using SEM.

- The total economic impact was estimated at 0.015-0.358% from Net Pracharat (USO) project.
- Social impact were related positively to higher income, no prior internet usage/experience, but; negatively related to elderly, lack of ability to access information, distinguishing fake information, lack of ideas in solving problems, etc.

Interview with Expert

November 12, 2020 (1:00 - 4:00 PM) Director of the Center for Digital Development Drive. for the Economy and society Ministry of Digital Economy.

What Next?

Moving forward, a comprehensive socio-economic assessment for Net Precharat should use mixed-method:

Quantitative studies
- Difference-in-Difference
- Propensity Score Matching
- Update on CMU data/survey

Qualitative (focus group) study
- Interview/questionnaire

The assessment (incl. updating data, conducting survey, meetings with stakeholders, data analysis and report writing) should take 2-3 months.

MDES, TOT, NBTC, Ministry of Interior, Village leaders, etc.

1. Main objective(s) that Net Pracharat should address.
2. Are they technologically capable of providing sufficient broadband capacity to all villages to allow Net Pracharat targets to be met?
3. Would it be financially viable for private network operators to provide connectivity via new rural terrestrial wireless broadband technologies?
4. What economic and social benefits could potentially be obtained by authorizing these technologies?
5. What are expected additional revenues for villagers, which sets a target of offering broadband access to rural users?
6. How often does MDES conduct activities such as (a) promoting local community business to become E-Commerce villages, (b) expand Net Pracharat Volunteer network, (c) form provincial Net Pracharat caretakers, and (d) organize Net Pracharat Village Model contest.
7. What are the objectives and expected benefits of activities in (6) above?

Further questions to capture impact/benefits of Net Pracharat for **users** (and **non-users**) in selected villages.
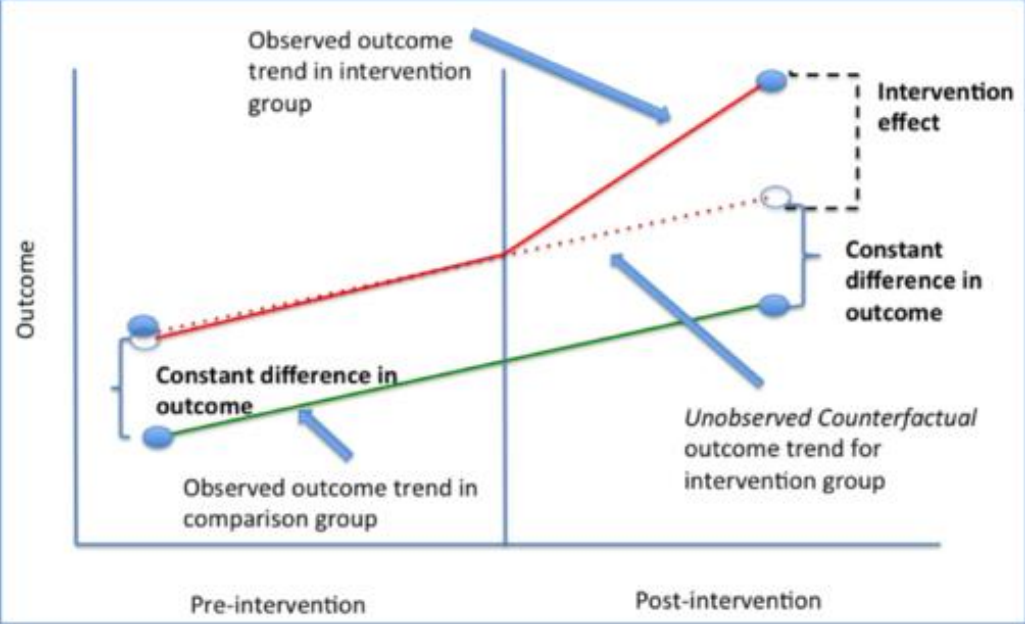
Difference-in-difference and propensity score matching are standard policy evaluation tools in the literature.

Measure socio-economic impact using village level data on pre- and post-Net Pracharat installment periods, for areas having access to Net Precharat (a.k.a **treatment group**) and areas without access to Net Pracharat (a.k.a **control group**). A direct comparison of means of socio-economic indicators and/or though regression analysis may be employed to quantify possible impact of Net Precharat

$$socio-economic\ indicator = \alpha + \beta_1 Dummy^{post} + \beta_2 Dummy^{treatment}$$
$$= +\gamma(Dummy^{post} \times Dummy^{treatment}) + \sum_k \phi_k\ Controls_k + \epsilon$$

We will read off and interpret the coefficient of interaction variable γ.

Why Difference-in-difference?

Socio-economic dimensions	indicators	
Social Economic Health Education	- % below poverty line - GINI - access to Gov.t services - Internet usage - academic qualification etc.	

Time-line

SPECIFICS	Month 1	Month 1	Month 2	Month 2	Month 3
Setup, pre-operations, and planning	20 days				
Finalization of socio-economic assessment framework and tools	20 days				
Stakeholder meetings, interviews		10 days	20 days		
Field survey (selected villages), focus group interviews			20 days	10 days	
Data analysis, prepare reports and presentations				10 days	20 days

Suggested: Survey N=400

References

- APT Report on Best Practice of Connectivity (2019) Village Broadband Internet Project (Net Pracharat) of Thailand, Asia-Pacific Telecommunity.

- Chiang Mai University (2021) รายงานผลการศึกษาเบื้องตน(Inception Report)

- Gertler, Paul J., Martinez, S., Premand, P., Rawlings, L.B., Vermeersch, C.M.J.. (2016). Impact Evaluation in Practice, Second Edition.

- International Telecommunication Union (2020). The Last-mile Internet Connectivity Solutions Guide. ITU Publications.

- Ministry of Digital Economy and Society (2020). The Internet Use of Net Pracharat Villages Report: January to June 2020. Thailand Digital Economy and Society Development Plan.

- Office of the National Economic and Social Development Board (2018). National Strategy 2018- 2037 (Summary). Bangkok: National Strategy Secretariat Office, Office of the National Economic and Social Development.

- Prasertpakdi, N. (2018). Saan Palang Pracharat [Collaborate Pracharat Power]. Bangkok: The Secretariat of The House of Representatives Print.

- Rekha, J. (2016). "Measuring the perceived impact of Internet on individuals in rural India". Working Paper-Indian Institute of Management, Ahmedabad (2016-03-61).

- Saan Palang Pracharat [Collaborate Pracharat Power]. Bangkok: The Secretariat of The House of Representatives Print.