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Frontier Health Markets (FHM) Engage

MARKET SIZING REPORT

An Innovative Approach to Identify Family Planning
Market Opportunities by Measuring and Visualizing
Sub-market Size in Nepal

February 15, 2024

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Acronyms

ADDOs	Accredited Drug Dispensing Outlets
A2IE	Asset to Income Estimator
CHAI	Clinton Health Access Initiative
CYP	Couple-Years of Protection
DHS	Demographic and Health Surveys
ECP	Emergency contraceptives
FP	Family Planning
FPET	Family Planning Estimation Tool
GPS	Geographic position system
INLA	Integrated Nested Laplace Approximation
IUD	Intrauterine device
LARC	Long Acting and Reversible Contraception
LEAP	Landscape and Projection of Reproductive Health Supply Needs
LMICs	Low- and middle-income countries
mCPR	Modern contraceptive prevalence
MICS	Multiple Indicator Cluster Survey
MSI	Marie Stopes International
OCPs	Oral contraceptive pills
RHSC	Reproductive Health Supplies Coalition
SAE	Small area estimation
SHOPS	Strengthening Health Outcomes of Private Sector
TMA	Total Market Approach
UN	United Nations
VAN	Visibility and Analytics Network
WRA	Women of reproductive age

Background

The Frontier Health Markets (FHM) Engage is a United States International Agency for Development (USAID)-funded project that aims to strengthen health markets to improve health outcomes in mixed health systems. FHM Engage focuses on strengthening local health markets to optimize public and private sector engagement to contribute to sustainable market efficiencies and increased access to family planning, maternal and child health, and other health services, products, and information.

The project has two main result areas: 1) improved market environment for greater private sector participation in the delivery of health products and services, and 2) improved equal access to and uptake of high-quality consumer-driven health products, services, and information. One of the project's focuses is to increase the effective collection, integration, and utilization of private sector data and market intelligence to inform public and private-sector decision-making.

The [Nepal market description](#) developed by FHM Engage revealed the need for improved market intelligence. While the market description identified provinces and demographic groups in which FP uptake has fallen behind, the lack of more detailed subnational market intelligence poses a major obstacle to strengthening private sector engagement in increasing access to and use of modern contraceptive products. Data pertaining to the supply and demand of contraceptive products and services is often unavailable, of poor quality, or too sparse to conclude from. Consequently, we applied an estimation approach that has been developed and was tested under the [project in Tanzania](#). This activity aims to enable market actors to identify geographic areas of opportunity for improving the provision of modern contraceptives by understanding where demand for different contraceptive products and services exists and allows for better targeting of interventions and products. It also provides market actors with a quantification of current and potential private sector contraceptive product volume, and real dollar value, to spur interest and action from a commercial perspective.

The Challenge

Private sector stakeholders face several challenges related to demand estimation. Due in large part to insufficient market intelligence, these private actors often struggle to accurately forecast demand. Despite manufacturers', importers', and large distributors' interest in better satisfying future demand as well as in introducing new products into Nepal's contraceptive market, their difficulties in accurately forecasting demand may deter such decisions.

Overview of tools to estimate family planning market size

Various market size estimation approaches have been applied to Family Planning. The Clinton Health Access Initiative (CHAI) Family Planning Market Report;¹ DKT’s Contraceptive Social Marketing Statistics;² the Family Planning Estimation Tool (FPET);³ Private Sector Counts;⁴ the FP Market Analyzer;⁵ and the Landscape and Projection of Reproductive Health Supply Needs (LEAP) / Commodity Gap Analyses⁶ utilize estimation methods primarily focus on quantifying the proportion or number of users by method and total volume of products at a **national level** across numerous countries.

Some of these tools focus on the size of a specific sector and **not the total market** (which includes social marketing and the for-profit commercial sector). For example, the CHAI Family Planning Market Report quantifies the total public sector FP procurement market in the 83 low- and lower-middle-income countries,¹ and DKT’s Contraceptive Social Marketing Statistics summarizes sales data reported by the social marketing sector.²

Other tools enable exploring patterns of public and private sector contraceptive use. The USAID-funded [Private Sector Counts](#) uses Demographic and Health Survey (DHS) data to provide the relative contribution of the public and private sectors to FP service delivery.⁴ The USAID-funded [Family Planning Market Analyzer](#) combines data from the DHS and projections of modern contraceptive prevalence (mCPR) from FP2020 to take a total market approach at exploring how changes in public and private actors’ market activities might alter mCPR.⁵ Reproductive Health Supplies Coalition (RHSC) has been conducting the LEAP / Commodity Gap Analyses, which provide estimates of the number of modern contraceptive users by methods and sector source (public vs. private), and the related costs nationally.⁶ Their report provides results for all 129 low- and middle-income countries (LMICs), and aggregated information on multiple countries by region or income group. While national-level estimates and utilization patterns by key demographics are crucial for understanding the overall market, market actors often need subnational information that is contextually and geographically relevant to their specific business activities in order to allow for better decision-making around how to target interventions and products within a country.

TABLE 1. EXISTING FP MARKET SIZE TOOLS

Tools	Developer	Characteristics of market sizing	Type of market	Types of data	Methodology
Family Planning Market Report	CHAI	Volumes and values of public sector FP procurement market	Public	Supplier data	Descriptive summary
Contraceptive Social	DKT	Social marketing product sales and	Private (non-profit)	Social marketing	Descriptive summary

Marketing Statistics		associated CYP by country		programs self-report sales data	
Family Planning Estimation Tool	Track20	Use all available data to develop annual country-specific estimation for contraceptive prevalence and unmet need and projection	Total (contraceptive prevalence rate)	Model combines population data, survey data, and service statistics (when input by the user)	Bayesian hierarchical model
Private Sector Counts	USAID (SHOPS Plus)	Illustrates contribution of the public and private sector to FP service delivery	Public and private	DHS	Descriptive summary
FP Market Analyzer	USAID (SHOPS Plus)	Describes FP users by demographics and method mix in each country, and allow users to explore potential scenarios for a TMA	Public and private	Combines data from DHS and FP2020's projections of mCPR	Descriptive summary combined with population estimates
LEAP / Commodity Gap Analyses	Reproductive Health Supplies Coalition	Estimates of number of users, method used, and related costs for selected country or region (multiple countries), and projects change	Public and private	Household surveys (DHS, MICS, other national surveys), projections developed by UN Population Division, data provided by SRH community, and data purchased from private sector entities	Estimations derived from a combination of specified primary data sources

Small area estimation approaches

Small area estimation (SAE) techniques are a family of statistical methodological approaches characterized by their focus on estimating parameters for small domains from survey data. Domains may refer to geographical area units, such as regions, counties, or districts, or demographic characteristics that the survey is not powered to measure with adequate precision. This technique is applied to address the challenge of not having a large enough sample size to attain a desired level of precision, often due to the sparseness of data in sub-populations. Small area estimation techniques have been applied across a wide range of disciplines, including health, demography, agriculture, and environmental planning. In the field of health, SAE techniques have been used to estimate HIV prevalence, child mortality, malaria prevalence, vaccination coverage, and modern contraceptive prevalence at a sub-national level.⁷⁻¹²

While the technique has been applied in different health topics, including family planning, the approach of applying SAE techniques and customizing the estimates to meet the private sector's contraceptive market intelligence needs has not been explored. The novel application outlined below builds on two previous examples of SAE in family planning. Notably, the Family Planning Estimation Tool and resources developed under the Sustaining Health Outcomes through the Private Sector (SHOPS) Plus.

The Family Planning Estimation Tool (FPET) has been primarily used to track FP progress, combining multiple data sources to generate annual estimates for contraceptive prevalence, unmet contraceptive need, and satisfied demand for family planning.³ While FPET can also be used at subnational levels,¹³ users must manually input subnational data for the country, which requires a comprehensive understanding of the tool's functionalities and data requirements, including the specific structure of data needed to generate accurate small area estimations. Additionally, the method can generate estimates only at the geographic level which the survey data includes.

Another important resource developed during SHOPS Plus's five-year program tenure was its research into contraceptive use patterns at sub-national geographic levels for a number of its partner countries. Recognizing the importance of understanding geographic variations within a country, SHOPS Plus developed continuously scaled choropleth maps for Tanzania, Guinea, Kenya, Uganda, and Nepal. By using color to correspond with characteristics of modern contraceptive use within geography, these maps visualize key contraceptive use indicators, including rates of utilization in both the public and private sectors subnationally.¹⁴

While the maps generated are useful for advocacy, policy, and program planning, they do not quantify the number of current or potential modern contraceptive users or examine the relative popularity of different contraceptive methods within a particular administrative unit. In Nepal, the SHOPS Plus maps' visualization, while novel, can be challenging to quantify the number of existing or potential modern method users and the relative popularity of different contraceptive methods by administrative units.

These examples of using SAE to estimate modern contraceptive utilization patterns offer valuable information; however, they each struggle to present existing data in a form that appropriately addresses private sector actors' market intelligence needs.

In this report, we present:

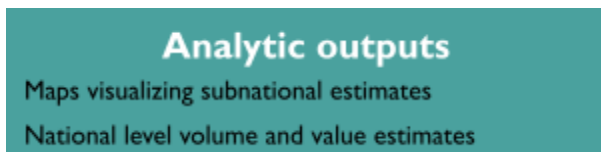
- 1) The application of a model-based SAE approach that offers estimates bounded within administrative region boundaries. This allows users to estimate the size of both current and potential new users of private sector contraceptive products and several contraceptive methods of interest (i.e., injectables, oral contraceptive pills, male condoms, and implants) at a sub-national scale, and
- 2) National-level estimates of the current and potential private market volume and value of several contraceptive methods in 2025

This report describes a new, multi-pronged analytical approach tailored to meet the business intelligence needs of the private sector.

Methodology

Process

Recognizing the private sector's desire for detailed contraceptive market information to aid their business decision-making (e.g., improved targeting of existing products, strategy for new product entry, etc.), we conducted estimations that resulted in two complementary sets of analytic outputs: 1) maps visualizing subnational variations in estimates of modern contraceptive users and potential users, and 2) national level contraceptive market volume and value estimates.



Given the limitations in publicly available data, accessible sources were identified through a desk review and consultation with FHM Engage staff.

Data

Our model utilized different types of data enumerated below.

- Cross-sectional survey data

Cross-sectional survey data come from Nepal DHS 2011, 2016, and 2022.^{15,16,17} DHS are nationally representative household surveys that serve as an important information source to gauge demand for contraceptive products. This survey data includes geographic position system (GPS) information which is required to accurately assign survey clusters to the current administrative boundaries (districts) in Nepal.

We extracted individual-level data from each DHS survey, including information on modern contraceptive use, the source of modern contraceptives, traditional contraceptive use, and unmet contraceptive need, as well as age, wealth quintile and GPS location. We used the revised definition of unmet need for contraception.¹⁸

- Administrative area shapefiles

We used administrative area shapefiles from the Humanitarian Data Exchange (HDX) open platform for administrative boundary levels (one and two) to create sub-national maps at district and provincial levels using the small area estimation technique.¹⁹

- Census

The population size for women of reproductive age (WRA, age 15-49) and young women (age 15-24) were extracted for all districts and provinces in Nepal from the most recent Nepal Census (2021).²⁰

- UN Population Division World Population Prospects 2022

The 2022 Revision of World Population Prospects²¹ was used to project the national population of women of reproductive age (aged 15-49) and young women (aged 15-24) from the year that the census was conducted to 2025 for the national volume and value estimation.

TABLE 2: INFORMATION EXTRACTED BY DATA SOURCE

Data source	Information
DHS surveys	Individual-level data on: <ul style="list-style-type: none"> • Contraceptive use, by method • Contraceptive need • Contraceptive source • Demographic information • Wealth quintile • Location information • Age
Asset to Income Estimator	<ul style="list-style-type: none"> • Median daily household income (3rd wealth quintile) ~ \$18.05 (USD)
Census	Population of women of reproductive age (age 15-49) and young women (15-24) by district and region
UN World Population Prospects	Population growth rate between year 2021 and 2025 in Nepal
National health facility registry	<ul style="list-style-type: none"> • Private health facilities • Location information
Pharmacy Council	<ul style="list-style-type: none"> • Pharmacy • ADDOs • Location information

- Health facility registry

Data on the location and ownership of various health facilities were extracted from Nepal's National Health Facility Registration System.²² Data containing the geolocation of operating pharmacies and chemists were obtained from Nepal CRS Company.

Methodology and Analysis

Key analytic terms and definitions

We categorized women who want to delay, space, or limit childbearing in our analyses into three groups: 1) current modern contraceptive users, 2) women with unmet FP needs, and 3) women using a traditional contraceptive method. Current modern method users include women who are at present using a modern method of contraception. Women with unmet FP needs are defined as women who do not want to become pregnant and who are not currently using any contraception.¹⁸ Thus, we divided the usually reported proportion of women who are not currently using any modern method of contraception into two non-overlapping groups: women with unmet FP needs and women using a traditional contraceptive method.

We used household wealth as a proxy for a woman's ability to pay. We defined women living in a household within the third wealth quintile or above as having the financial means to potentially access contraceptive products from the private sector. We used M4M's Asset to Income Estimator (A2IE) tool,²³ which combines asset-based wealth rankings (from the DHS or Multiple Indicator Cluster surveys) and income distribution data²⁴ to estimate median individual and household incomes by wealth quintile. According to the A2IE tool, these women have a median daily household income of at least \$18.05 USD.

Rationale for our definition of financial capacity

We approximated women's ability to pay for their choice of contraceptive methods by considering their household wealth quintile. Women in a household in the top three wealth quintiles currently using a modern contraceptive method were significantly more likely to have obtained their method from a private sector source (37.7 percent) than those in the lowest two wealth quintiles (14.9 percent). Using the A2IE tool, household daily income in the lowest two wealth quintiles was below USD 15, reflecting limited disposable income.

We examined where modern contraceptive users obtained their contraceptive products and categorized the sources into two groups: private sector and public sector (see Table 3). To maintain a binary definition that encompasses all respondents, women within the data who reported receiving their contraceptive method from a friend, relative, or neighbor were categorized as belonging to the public sector. This classification is based on the premise that these women are current modern contraceptive

users who, similar to public sector clients, could have the potential to become private sector users. While imperfect, this classification served as a practical means to comprehensively account for all Nepalese women who reported using a modern contraceptive method (those who reported receiving their contraceptive method from a friend, relative, or neighbor consisted of 0.18% of modern contraceptive users in DHS 2022).

TABLE 3: ANALYTIC TERMS AND DEFINITIONS

Terminology	Definition applied
Private sector	Includes for-profit, non-profit, social-marketing, and faith-based organizations, shops/kiosk
Public sector	Government, friend/relative/neighbor
Short-term contraceptive methods	Condoms, oral contraceptive pills, injectables, emergency contraceptive pills
Long-acting reversible methods	Intrauterine device, implant
Financial capacity	Women living in a household in third or higher wealth quintile (median daily household income of at least \$18.05 USD)

We also conducted sub-analyses for users of specific short-term and long-acting reversible contraceptive (LARC) methods, which included injectables, oral contraceptive pills (OCPs), male condoms, and implants. For each of these methods, we generated estimates for those 1) obtaining from the private sector, and 2) obtaining from the public sector and with financial capacity. Due to the very low proportion of emergency contraceptive (EC) users and intrauterine device (IUD) users reported in the DHS data, we did not produce sub-national use estimates for these methods.

We applied our analytical model to calculate small area estimates for each of these indicators to both all women of reproductive age (women aged 15 to 49) and young women (aged 15 to 24).

Analytic model for sub-national estimation of indicators

We applied a Bayesian hierarchical model framework, as described by Mercer, Lu, and Proctor,²⁵ that integrates multiple surveys, survey designs, and levels of uncertainty and allows for a spatiotemporal smoothing of estimates. The model requires data from at least two surveys and assumes that there is an underlying value of the indicators and that the direct survey estimates are measurements with associated uncertainty. The logit transformed data assumed underlying true indicators were modelled linearly with independent spatially structured random effects, random walks of order 1, and temporally structured space-time interactions to account for subnational temporal trends. Survey-year and survey-geography random effects were also included to account for potential survey biases. We constructed twelve possible models with each of these components to fit each indicator for women of reproductive age (aged 15-49) and young women (aged 15-24). To identify the best-performing model for each indicator

and demographic group, we calculated goodness of fit and model complexity indicators (the sum of the log conditional predictive ordinate (LCPO), the deviance information criteria (DIC), and the Watanabe-Akaike information criterion (WAIC)). The model with the lower DIC, WAIC, and the higher LCPO was selected. When different criteria pointed to different models, we used a majority rule. For instance, if the same model was identified by having the lowest DIC and the lowest WAIC, but a different model had the highest LCPO, we selected the model that met the criteria from two goodness of fit and model complexity indicators.

We fit the models using R computing language, adapting the analysis codes from the associated GitHub repository of the Mercer et al. article.²⁶ The hierarchical Bayesian space-time model was fit using the Integrated Nested Laplace Approximation (INLA) package in R.²⁷ We computed the median estimates for each indicator at the specified administrative level (Table 4).

The model yields a proportion that we then converted to absolute population estimates for each category. To determine the population value associated with each indicator rate (Table 4), we multiplied the estimated indicator rate by the appropriate sub-population value (e.g., all women of reproductive age), as described in the 2021 Nepal Census results, for the same geographic area. Finally, we displayed results on maps at the district or provincial level as appropriate. Maps were generated using R computing language.

As the precision of indicator estimates relies heavily on the quantity of data available within the underlying data sources, indicators with more data can be estimated at smaller geographic regions, while those with relatively less data must be estimated at larger geographic levels to capture the greater amounts of available data. The more data that are available, the more reliable and precise the estimate is likely to be. Not all indicators will have the same amount of available data, as some indicators include questions that follow a skip pattern. For example, a woman who reports not using a modern contraceptive method will not then be asked what type of method she uses. Consequently, we estimated indicators with greater amounts of data, such as mCPR, at the district level, while those with less data, such as the source or type of their method, at the provincial level.

TABLE 4: SUB-NATIONAL ESTIMATION OF CONTRACEPTIVE USERS, POTENTIAL USERS, AND ASSOCIATED INDICATORS

Type of users	Indicator	Level
Current modern method users	WRA/young women using a modern contraceptive method <ul style="list-style-type: none"> All By method type: private source vs. public source with financial capacity 	District Province
Women with unmet FP needs	WRA/young women with an unmet need for contraception <ul style="list-style-type: none"> All 	District District

	<ul style="list-style-type: none"> Those with financial capacity 	
Women using a traditional contraceptive method	WRA/young women using a traditional contraceptive method <ul style="list-style-type: none"> All Those with financial capacity 	District District

National estimation of volume and value by types of contraceptive product

In addition to estimating the number of current users, women with unmet FP need, and women using a traditional modern method at district and provincial levels, we calculated the current and potential market size of the Nepalese private sector, considering the number of clients, volume, and revenue for a full year’s protection for the four contraceptive products of focus (i.e., injectables, OCPs, male condoms, and implants) for the year 2025.

Estimating the number of clients of the private sector for the four contraceptive methods

We began by combining the national-level population data of Nepalese women aged 15 to 49 from the 2021 Nepal census with the population projected to 2025 by the estimated population growth rate, multiplied by family planning use and need proportions in the 2022 Nepal DHS. We used these data to estimate the absolute population values of the following groups:

- Group 1 – modern contraceptive users who are private sector consumers
 The number of WRA currently using one of the four modern contraceptive methods of interest who last obtained their method from a private sector source.
- Group 2 – modern contraceptive users who are public sector consumers
 The number of WRA currently using one of the four modern contraceptive methods who last obtained their method from a public sector source.
- Group 3 – women with an unmet need
 The number of WRA defined as having an unmet need for contraception.
- Group 4 – women who are traditional method users
 The number of WRA currently using a traditional method of contraception.

Our estimates focused on the current private sector market size in 2025 for the four contraceptive methods of interest – injectables, OCPs, male condoms, and implants. Next, we aimed to illustrate the potential market growth with a more favorable enabling environment for private sector engagement in Nepal’s contraceptive market. We considered women belonging to Groups 2 through 4 as potential new private client groups. However, we know that not all of these women will become new private sector

clients for contraception. In order to produce credible estimates of the number of women from each group that could be expected to become new private sector clients, we answered the following four key questions with a series of informed assumptions.

Key Questions and Assumptions

Question: What segments of the population are more likely to seek contraceptive care from private sector sources?

Assumption 1: Women belonging to households in the top 3 wealth quintiles are more likely to seek private sector sources.

Question: How many contraceptive users currently obtaining their method from a public sector source who, under different circumstances, would be willing to obtain it from a private sector source?

Assumption 2: If Nepal had a private sector utilization rate similar to some of its peer countries, some women who are currently obtaining their product from the public sector would instead be obtaining it from the private sector.

Question: How many women considered as having an unmet need for contraception who would be willing to adopt a modern contraceptive method?

Assumption 3: The implementation of a well-designed interpersonal communication intervention would help to meet the needs of a proportion of women with a currently unmet need and they would adopt a modern method.

Question: How many women currently using a traditional contraceptive method who would be willing to adopt a modern contraceptive method?

Assumption 4: The implementation of a well-designed interpersonal communication intervention would help to meet the needs of women currently using a traditional method through the adoption of a modern method.

Assumption 1: Women belonging to households in the top 3 wealth quintiles are more likely to seek private sector sources.

We defined those belonging to households in the top three wealth quintiles as having the financial capacity to obtain contraceptive products from a private sector source. Financial capacity differs from willingness to pay. While financial capacity implies that women in these upper wealth quintiles are more likely to have the means to access private sector contraceptive products, it does not suggest that they are willing to do so. Nonetheless, Assumption 1 allowed us to home in on a subset of the population with an increased likelihood of becoming private sector clients.

Assumption 2: If Nepal had a private sector utilization rate similar to some of its peer countries, some women who are currently obtaining their product from the public sector would instead be obtaining it from the private sector.

To determine the proportion of contraceptive clients likely to seek products from the private sector, we conducted a literature search of available evidence in any intervention to convert public sector users to private sector users through PubMed and Google Scholar. As the search revealed a scarcity of evidence, we analyzed private sector utilization rates among Nepal's peer countries. Following discussions with technical staff from FHM Engage working in Nepal, we determined that Bangladesh and the Philippines could serve as aspirational benchmarks for Nepal, given their more enabling market environments that have resulted in greater private sector utilization for contraceptive products and comparable contexts.

Based on analyses of the 2017-2018 Bangladesh DHS and 2022 Philippines DHS,^{28,29} private sector utilization among women in the top three wealth quintiles using the four contraceptive methods of interest was 65.5% and 68.1% respectively. If Nepal was to achieve a comparable private sector utilization rate for the four contraceptive methods of interest as those of Bangladesh and the Philippines respectively, 29.1% and 34.5% of current public sector Nepal clients in the top three wealth quintiles (our proxy for financial ability in these analyses) would shift to the private sector.

Assumption 3: The implementation of a well-designed interpersonal communication intervention would help to meet the needs of a proportion of women with a currently unmet need and they would adopt a modern method.

Discussions with FHM Engage staff working in Nepal identified interpersonal communication interventions and efforts to expand DMPA-SC as potential strategies in Nepal to help meet the needs of women wishing to avoid a pregnancy. We searched the existing literature to identify examples of interpersonal communication interventions that have been applied in South Asia to increase women's use of modern contraceptive methods, as well as evidence on the effect of DMPA-SC's introduction and scale-up on contraception prevalence rates and method mix. We identified five intervention studies that were conducted in South Asia that focused on a combination of relevant components including the provision of counseling, increased engagement with community members, training for providers on FP service provision and/or counseling, and establishing private providers' network.³⁰⁻³⁴ These studies found the interventions increased mCPR by between 4.0% to 10.4%.

However, it is important to note that the definition of unmet need may mask a significant proportion of potential need from women whose husbands are away, but return for periods during the year. Among a subset of women who indicated having an unmet need for contraception in Nepal, 73% responded the reason for not using contraceptives was infrequent sex or because their husbands were away. Similarly, among married women who were found to have an unmet need, 74% were not currently residing with their husbands. These findings suggest that a majority of Nepalese women with an unmet contraceptive need may not have a continuous contraceptive need. However, we found a lack of literature that tailored

intervention(s) to women with husbands away. Amid the lack of evidence, the intervention effect applied to this group of women described above may be an overestimate.

Assumption 4: The implementation of a well-designed interpersonal communication intervention would help to meet the needs of women currently using a traditional method through the adoption of a modern method.

While the five intervention studies described under Assumption 3 also apply to women who currently use a traditional method of contraception, women using a traditional method of contraception tend to be more educated (>50% have secondary education or above) than modern contraceptive users and women who have an unmet need for contraception.¹⁷ To account for this greater propensity for traditional method use among more educated women, we drew on evidence from an intervention study whose results found that women who had an education of grade 8 or above had a reduced intervention effect (57% of the overall intervention effect).³¹ We applied this reduced intervention effect to women (rounded up to 0.6) who currently using a traditional method of contraception.

APPLYING ASSUMPTIONS TO THE SPECIFIC GROUPS

The following table illustrates how we applied our assumptions to each group in order to produce our estimates for the number of women who could be expected to become new private contraceptive clients for our methods of interest.

TABLE 5: APPLICATION OF ASSUMPTIONS IN CALCULATING THE NUMBER OF CONVERTIBLE PRIVATE SECTOR CLIENTS

Conversion Group	How We Applied Our Assumptions
Group 2: Current Public sector users	All public sector users × % in top 3 wealth quintiles (assumption 1) × %Δ in private sector utilization (assumption 2) = New private sector clients from public sector
Group 3: Current unmet need	All women with an unmet need × % converted through interpersonal communication intervention (assumption 3) × % in top 3 wealth quintiles (assumption 1) × %Δ in private sector utilization (assumption 2) = New private sector clients previously with an unmet need
Group 4: Current traditional method users	All women currently using a traditional method × % converted through interpersonal communication intervention (assumption 4) × % in top 3 wealth quintiles (assumption 1) × %Δ in private sector utilization (assumption 2) = New private sector clients previously using a traditional method

Estimating the number of clients by type of contraceptive method

Along with estimating the potential number of new private sector clients, we expanded our number of possible private sector scenarios by considering three different private sector contraceptive method mixes.

- Method mix scenario 1: Maintaining Nepal's current private sector method mix.
- Method mix scenario 2: Examining the influence of DMPA-SC expansion.
 - To identify the effect that DMPA-SC expansion might have on Nepal's private sector method mix, we applied proportional changes seen in Uganda's method mix between 2016 and 2022 to Nepal's current private sector method mix.
- Method mix scenario 3: Policy scenario from the FP Market Analyzer - Barriers removed to allow the private sector to pay a greater role in LARC provision as implants increase in popularity.
 - To estimate the potential effect of the policy scenario (Policy Scenario 4) described in the FP Market Analyzer, we estimated the application of this scenario (the popularity of implant doubles in the overall method mix, up to a maximum of 40%, and the private sector utilization of LARCs increase by 20 percentage points) to Nepal's private sector method mix.

Method mix scenario 2: Examining the influence of DMPA-SC expansion

Currently, the use of DMPA-SC is limited in Nepal (1% of injectables). This is despite both DMPA-IM and DMPA-SC being allowed to be distributed through the country's health clinics, pharmacies, and chemists. While a recent publication found high acceptability of DMPA-SC in Nepal,³⁵ its use has been limited due to a restricted supply.³⁶

To estimate tentative changes to Nepal's current private sector method mix, we examined changes to the method mix in other countries where DMPA-SC has been introduced and scaled up. We selected Uganda as a prime example for having recently experienced major changes in its policies related to injectable distribution and enabling self-injection. In 2016, DMPA-SC was added to Uganda's National Essential Medicine List,³⁷ and in 2017 Uganda changed its policies to allow licensed and accredited drug shops to stock and administer injectable contraceptives (including DMPA-SC) in 20 districts.³⁸ Finally, to further facilitate access to injectable contraceptive methods, self-injection was approved in 2019.

We compared the national method mix from Uganda between 2016 and 2022 using survey data from Performance Monitoring for Action (PMA) (Table 6),³⁹ and applied the percent change of the corresponding method to Nepal's current private sector method mix.

TABLE 6: PERCENT CHANGE IN METHOD MIX IN UGANDA BETWEEN 2016 AND 2022

Method	Percent change
DMPA-IM	58% decrease
DMPA-SC	14.8 percentage points in 2022
OCP	3% decrease
Male condoms	26% decrease
Implants	80% increase

Method mix scenario 3: Policy scenario from the FP Market Analyzer - Barriers removed to allow the private sector to pay a greater role in LARC provision as implants increase in popularity

Analysis of previous DHS Survey in Nepal showed an increase in popularity of implant in the overall method mix. Currently, the provision of LARCs is predominantly by the public sector, especially for implants (89% provided by the public sector).

Policy Scenario 4 from the FP Market Analyzer illustrates potential changes if barriers were removed to allow the private sector to play a greater role in LARC provision as implants increase in popularity. As this policy scenario applies to Nepal and may have cross-country applicability, we estimated Nepal's private sector method mix under this policy scenario (Table 7).

TABLE 7: PRIVATE SECTOR METHOD MIX UNDER THE POLICY SCENARIO

Method	Private sector method mix
DMPA-IM	14.3%
DMPA-SC	0.1%
OCP	11.7%
Male condoms	17.4%
Implants	28.8%

Estimating volume and value by type of contraceptive method

For the three short-term methods (injectables, OCPs, male condoms), we then multiplied each method by its respective Couple-Years of Protection (CYP)⁴⁰ to determine, on average, the number of product units of each method that could be expected to be sold annually to provide each woman with a year's worth of prevention from pregnancy, e.g., 120 pieces of male condoms required for 1 CYP. For the long-acting reversible methods, we assumed the annual unit sales to be the same as the number of users who obtained that method from the private sector. We also calculated the private sector market value for each of the four contraceptive products by multiplying the annual units sold for each method by its average retail price, as previously estimated by FHM Engage market visit observations conducted in October 2023 (Table 8).³⁶ These analyses resulted in an estimate for the number of current and potential

private sector clients of each method, annual unit sales of each method, and annual revenue for each method.

Sensitivity analysis of estimated volume

We compared our estimated current private sector volume in 2022 with Nepal CRS Company’s sales volume in 2022 and the estimated market share of Nepal CRS Company in the private market for each short-term contraceptive method of interest.

Emergency contraceptive pills volume and value estimation

Besides the four methods identified above, emergency contraceptive pill (ECP) was also a method of interest for the private sector. However, key challenges have been identified in the accurate measurement and monitoring of ECP use.^{41,42} Unlike other modern contraceptive methods, ECP is used to help women prevent pregnancy after sexual intercourse, often in instances of contraceptive non-use, contraceptive failure, incorrect use, or forced sex. While ECP is included as an option in the DHS as a response to current contraceptive method use, women may not report using ECP currently because it is not used regularly or during intercourse. Previous research has shown that the conventional approach (used in DHS) to measuring ECP use largely underestimates ECP use in the past 12 months.⁴¹

Due to existing ECP measurement challenges and a lack of alternative market data for ECP use in Nepal, we used sales data from Nepal CRS Company in 2022 and its estimated market share to provide an aggregate estimate of the private sector market volume and value of ECP as an alternative approach.

TABLE 8: PRODUCT PRICING APPLIED FOR VALUE ESTIMATION

Product	Unit	NPR per unit	NPR per year	USD per unit	USD per year
Injectables (DMPA-IM, DMPA-SC)	1 vial (3-month)	NPR 80	NPR 320	\$0.60	\$2.40
OCP*	1 month course	NPR 80	NPR 1,200	\$0.60	\$9.00
Male condoms	1 pack (3 pieces)	NPR 30-50 (plain) NPR 100 (enhanced)	NPR 2,600*	\$0.49	\$19.50
ECP	1 dose (single use)	NPR 80	--	\$0.60	--
Implants	1 implant (5 years)	NPR 1,400		\$10.50	

*Note: Price of second generation OCP was used; the average price of male condoms (NPR 65) was used for estimation.

Results

Subnational estimation of indicators

This section includes estimations for all WRA. Estimations for young women (age 15 to 24), as well as tables of estimated numbers at the subnational level that populate each map, are included in the Annex.

- Current modern contraceptive users

Figure 1 illustrates the number of women using a modern contraceptive method at a district level. The map shows the uneven distribution of modern contraceptive users across the country. Population

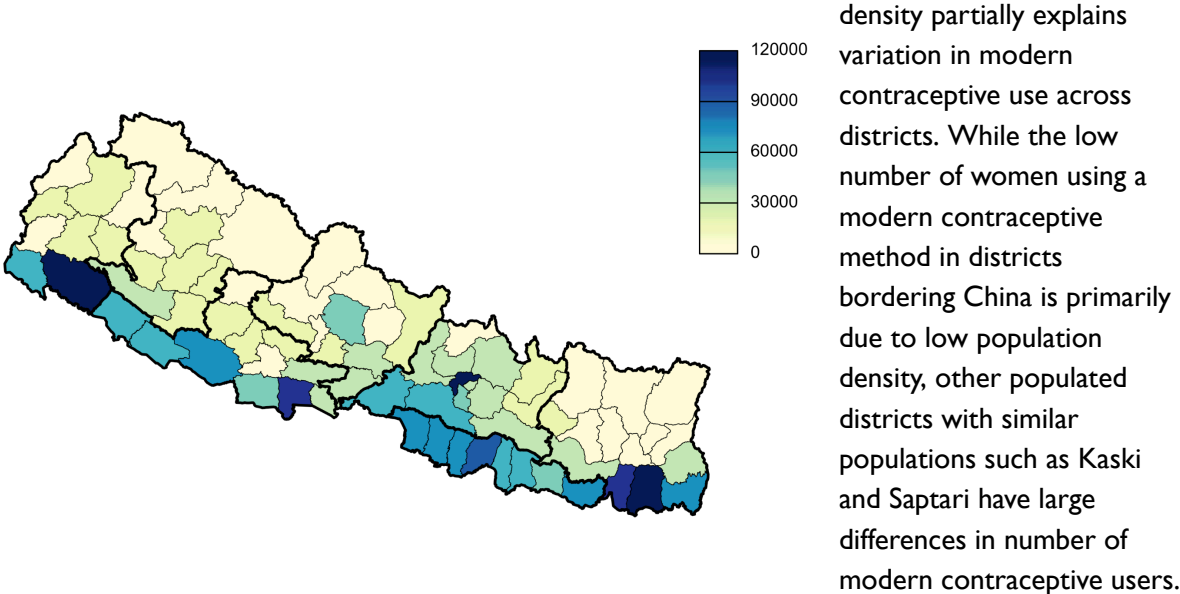


FIGURE 1: NUMBER OF WRA USING A MODERN CONTRACEPTIVE METHOD BY DISTRICT

Figure 2 illustrates the composition of the private facility density by type of facility in each province. Pharmacies and chemists are the predominant types of private sector providers, and slightly less in Bagmati where more private health clinics and hospitals are located.

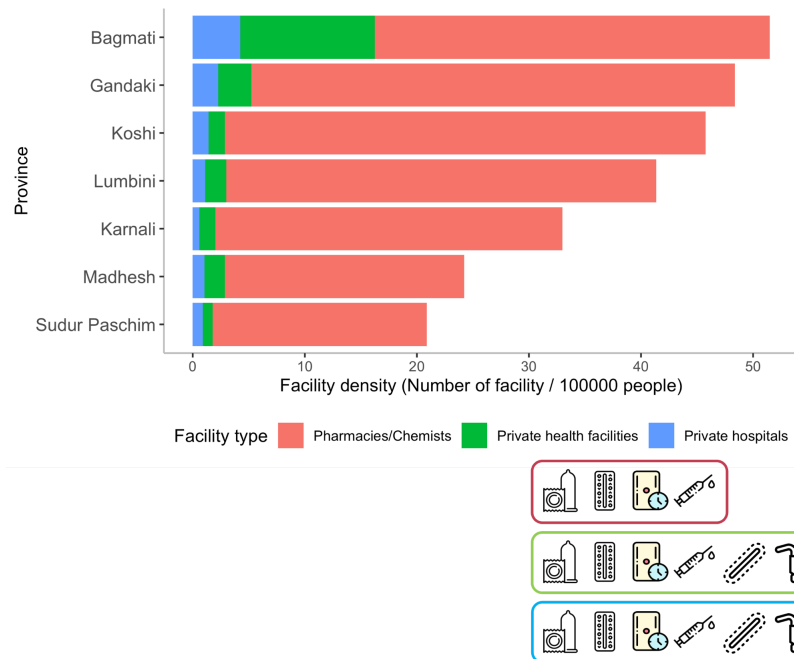
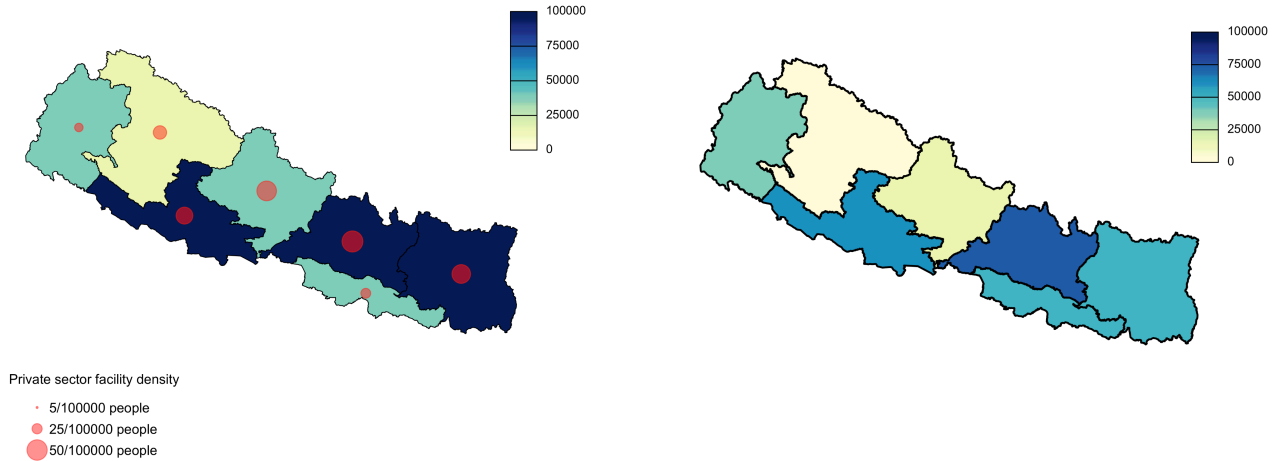


FIGURE 2: PRIVATE FACILITY COMPOSITION AND DENSITY BY PROVINCE.

Besides knowing the overall density of private facilities, it is also important to consider the types of contraceptive methods that can be sold by each facility type. Pharmacies and chemists can sell injectables, OCPs, ECP, and male condoms.

- Current modern contraceptive users – Short-term methods

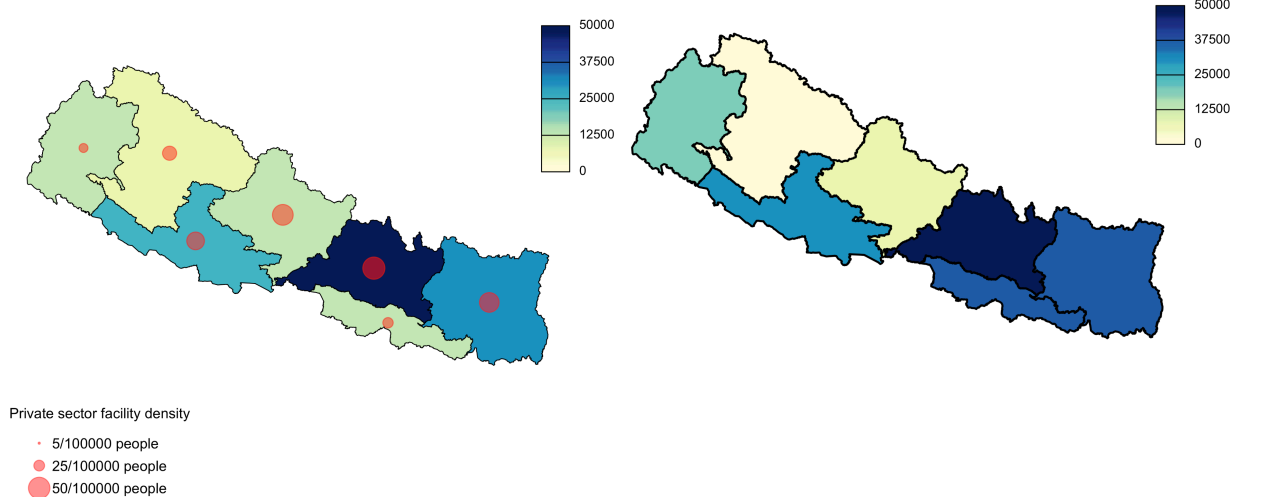
Similarly, Figures 3a and 3b show the sector where women obtained their short-term contraceptive products. The red circles in Figure 3a illustrate the density of all private facilities within that region. Figure 3b shows the number of women who obtained their short-term contraceptive products from a public sector source that are considered as having the financial capacity to obtain them from a private source. While Bagmati and Lumbini have the highest number of short-term method users who obtained from the private sector, a sizable number of users in the two provinces who have financial capacity obtained their method from the public sector. Market actors may be able to target efforts in these provinces to encourage sourcing of short-term contraceptive methods from the private sector.



FIGURES 3: NUMBER OF WRA USING SHORT-TERM CONTRACEPTIVE METHODS A) FROM A PRIVATE SECTOR SOURCE OVERLAYED WITH DENSITY OF PRIVATE HEALTH FACILITIES AND PHARMACIES/CHEMISTS (LEFT), B) FROM A PUBLIC SECTOR SOURCE WITH FINANCIAL CAPACITY (RIGHT).

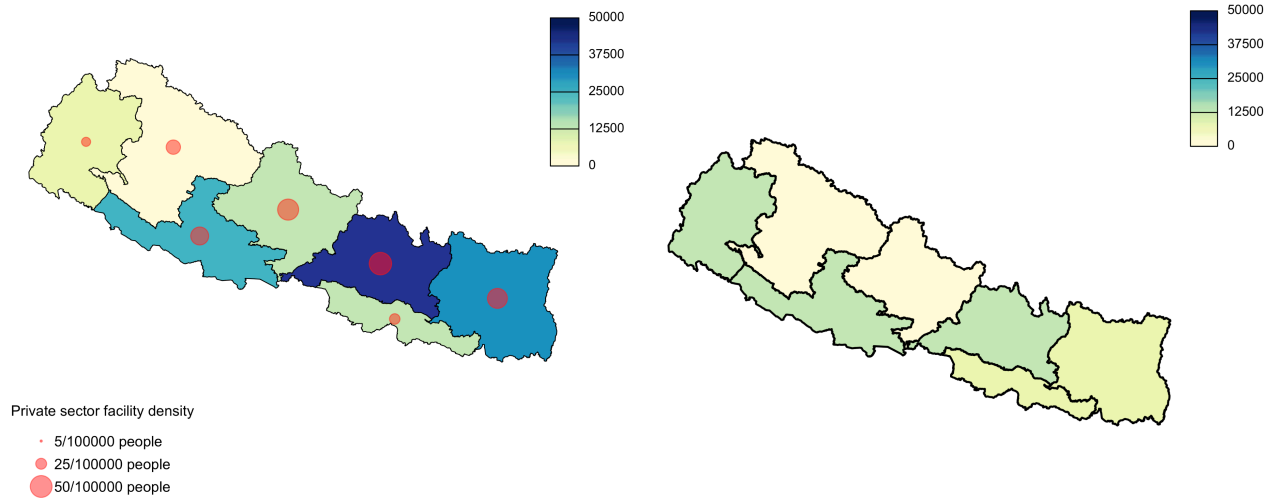
- Current modern contraceptive users – Injectable contraceptives

Figures 4a and 4b follow the same design while focusing on the number of women using injectable contraceptives. As injectable contraceptives can be distributed at private health facilities, pharmacies, and chemists, the red circles in Figure 4a include the density of all private facilities. A comparison of the two maps shows that Madhesh and Lumbini have more injectable users obtaining from the public sector with financial capacity than current private sector injectable clients.



FIGURES 4: NUMBER OF WRA USING INJECTABLE CONTRACEPTIVES A) FROM A PRIVATE SECTOR SOURCE OVERLAYED WITH DENSITY OF PRIVATE HEALTH FACILITIES AND PHARMACIES/CHEMISTS (LEFT), B) FROM A PUBLIC SECTOR SOURCE WITH FINANCIAL CAPACITY (RIGHT).

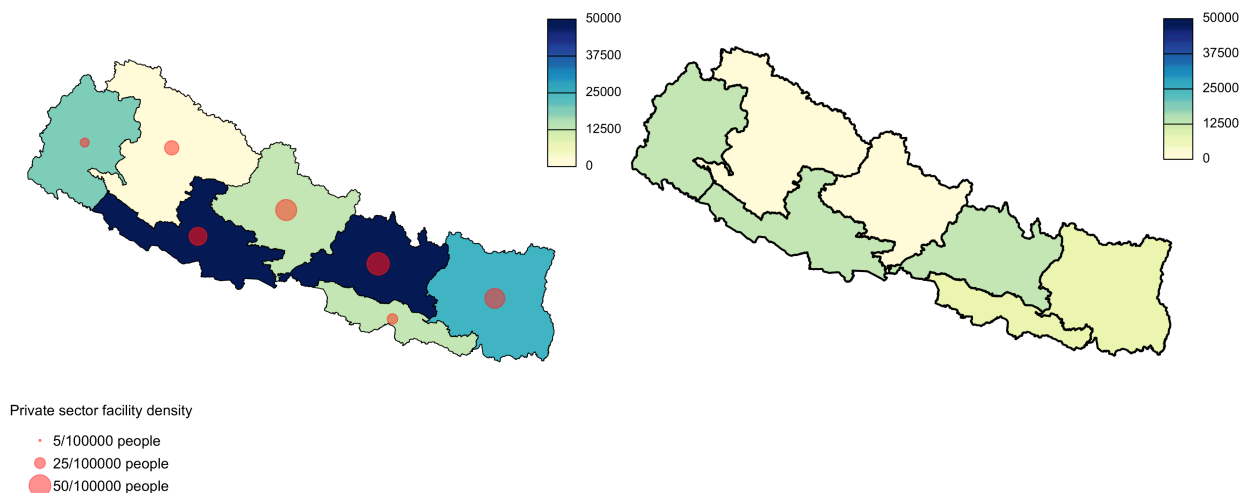
- Current contraceptive users – Oral contraceptive pills



FIGURES 5: NUMBER OF WRA USING ORAL CONTRACEPTIVE PILLS A) FROM A PRIVATE SECTOR SOURCE OVERLAYED WITH DENSITY OF PRIVATE HEALTH FACILITIES AND PHARMACIES/CHEMISTS (LEFT), B) FROM A PUBLIC SECTOR SOURCE WITH FINANCIAL CAPACITY (RIGHT).

Figures 5a and 5b focus on number of women using OCPs. In most provinces, while many women already obtain oral contraceptive pill users from the private sector, an estimated 70,000 women with financial capacity obtain OCPs from the public sector in total. Madhesh and Sudur Paschim have more women with financial capacity obtaining OCPs from the public sector than the private sector.

- Current modern contraceptive users – Male Condoms



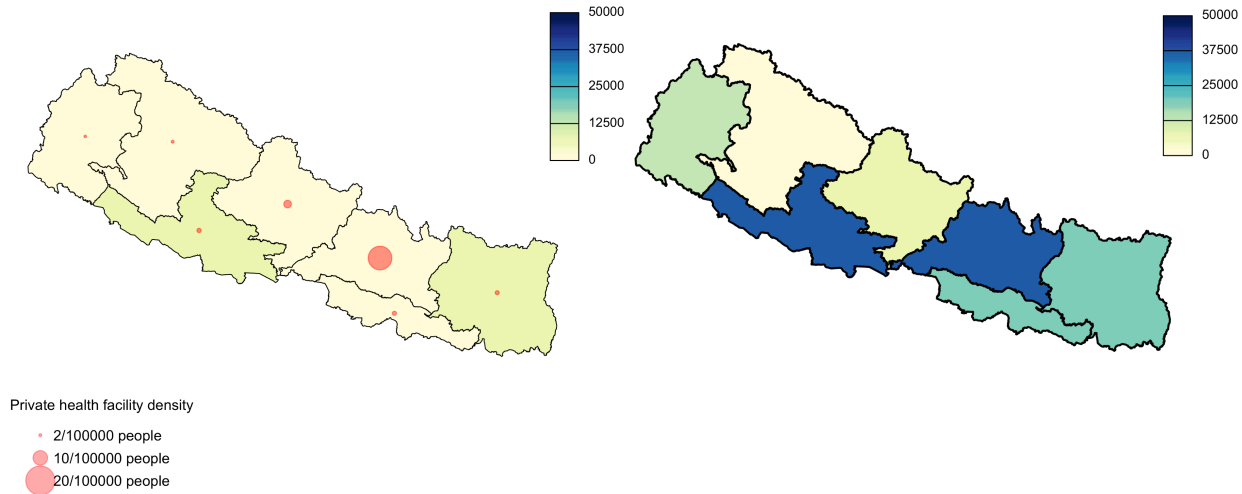
FIGURES 6: NUMBER OF WRA USING MALE CONDOMS A) FROM A PRIVATE SECTOR SOURCE OVERLAYED WITH DENSITY OF PRIVATE HEALTH FACILITIES AND PHARMACIES/CHEMISTS (LEFT), B) FROM A PUBLIC SECTOR SOURCE WITH FINANCIAL CAPACITY (RIGHT).

Figures 6a and 6b illustrate the estimated number of women using male condoms by sector. Note that the private facility density includes private health facilities and pharmacies/chemists. Additional outlets (such as shops) are also allowed to distribute male condoms but no representative location information was available for such outlets.

Bagmati and Lumbini comprise more than half of the national private sector male condom users. While male condom users predominantly obtain the products from the private sector, an estimated 50,000 women with financial capacity obtain male condom from the public sector.

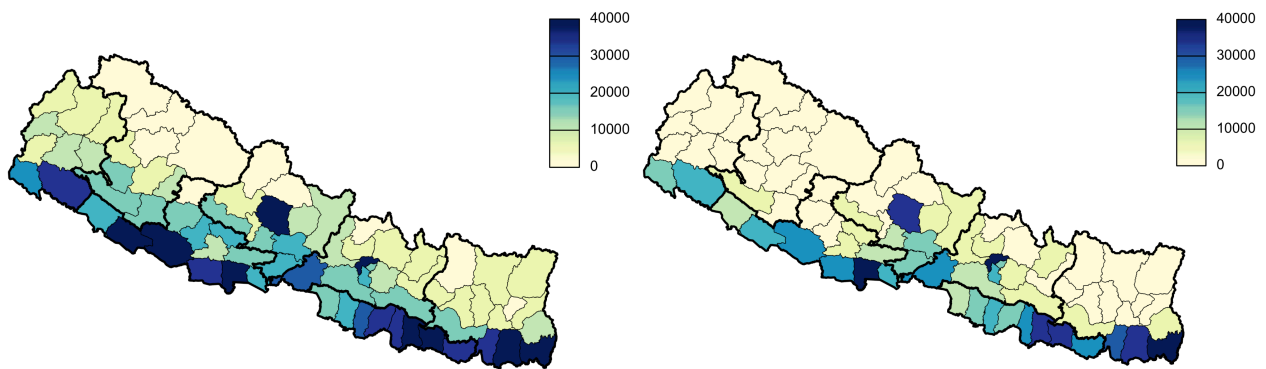
- Current modern contraceptive users – Implants

Figures 7a and 7b illustrate the estimated number of implant users by sector. While implants can be distributed by private facilities, only a small proportion of implant insertions occur in private sector facilities, which does not correlate with the density of private health facilities by province. Bagmati and Lumbini have high numbers of implant users with financial capacity that are currently obtaining their method in the public sector.



FIGURES 7: NUMBER OF WRA USING IMPLANTS A) FROM A PRIVATE SECTOR SOURCE OVERLAYED WITH DENSITY OF PRIVATE HEALTH FACILITIES (LEFT), B) FROM A PUBLIC SECTOR SOURCE WITH FINANCIAL CAPACITY (RIGHT).

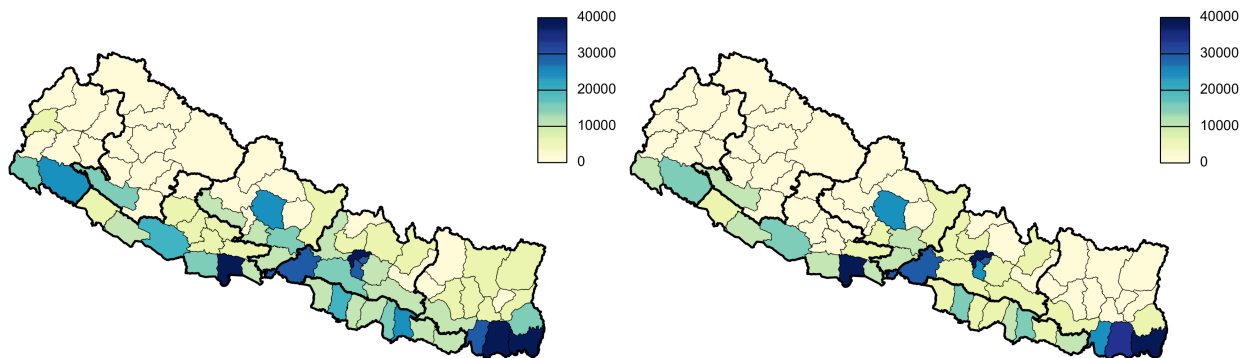
- Potential modern contraceptive users – women with an unmet need for contraception



FIGURES 8: NUMBER OF WRA A) WITH AN UNMET NEED FOR CONTRACEPTION (LEFT), B) WITH AN UNMET NEED FOR CONTRACEPTION WITH FINANCIAL CAPACITY (RIGHT).

Figures 8a and 8b illustrate the estimated number of women with an unmet need for contraception and those with financial capacity at the district level. However, it is important to note that the definition of unmet need may mask a significant proportion of potential need from women whose husbands are away, but return for periods during the year. Among women who are married, the majority of women with an unmet need for contraception are not currently residing with their husbands/partners, indicating a possible lack of continuous contraceptive need for these women. Additional research is needed to identify the methods that might be appropriate and preferred to meet their more sporadic needs.

- Potential modern contraceptive users – women using a traditional contraceptive method



FIGURES 9: NUMBER OF WRA A) USING A TRADITIONAL CONTRACEPTIVE METHOD (LEFT), B) USING A TRADITIONAL CONTRACEPTIVE METHOD WITH FINANCIAL CAPACITY (RIGHT).

Figures 9a and 9b illustrate the estimated number of women with a financial capacity that are currently using a traditional contraceptive method at the district level. The most highly populated districts have a higher proportion of traditional methods use, namely Kathmandu, Rupandeh, and Jhapa. Additionally, a high proportion of women using a traditional contraceptive method have financial capacity, especially among the most populated districts.

National estimation of volume and value by types of contraceptive product

Current Market Value

Estimates of the current private sector market size for the four contraceptive methods that could be estimated from Nepal DHS data can be found in Table 9. We estimate that the current retail value of the Nepal private market for injectable contraceptives, OCPs, male condoms, and implants in 2025 would be \$6,124,000.

TABLE 9: ESTIMATED CURRENT NEPAL PRIVATE SECTOR CONTRACEPTIVE MARKET VOLUME AND VALUE OF FOUR PRIORITY PRODUCTS.

Contraceptive Product	Estimated number of current private sector client (2025)	Estimated annual private sector product volume (2025)	Estimated current annual private sector product value (2025)
Injectable methods	181,000	726,000	\$436,000
Oral contraceptive pills	147,000	2,211,000	\$1,327,000
Male condoms	219,000	26,261,000	\$4,267,000
Implants	42,000	42,000	\$445,000
Total			\$6,474,000

Sensitivity analyses

Table 10 shows a comparison of our estimated current private sector volume with Nepal CRS Company’s sales volume in 2022 and the estimated market share of Nepal CRS Company in the private market for each short-term contraceptive method of interest. We found our estimated volume for oral contraceptive pills and male condoms was within 10% difference from the sales data. However, our estimated volume of injectable contraceptives was 56% of the annual private sector product volume based on the sales data. As there are no specific methodological issues identified in the estimation of

injectables from national survey data from literature, we proceeded the analyses with the estimation from survey data and noted the need for additional data to resolve the discrepancy later in the report.

TABLE 10: COMPARISON OF ESTIMATED CURRENT NEPAL PRIVATE SECTOR CONTRACEPTIVE MARKET VOLUME OF THREE PRIORITY PRODUCTS WITH NEPAL CRS COMPANY'S SALES DATA.

Contraceptive Product	Nepal CRS Company estimated market share	Annual private sector product volume based on Nepal CRS Company data and estimated market share (2022)	Estimated annual private sector product volume (2022)
Injectable methods	90%	1,226,000	686,000
Oral contraceptive pills	60% - 75%	2,265,640*	2,091,000
Male condoms	40% - 50%	23,539,000*	24,840,000

*The upper estimate of the Nepal CRS Company market share was used to calculate the annual private sector product volume.

Emergency Contraception Private Sector Market Value

Due to the uncertain validity of DHS data for ECP estimation, the ECP private sector market value was estimated using sales data. We estimate the current Nepal private market retail value in 2022 for ECP to be \$1,347,000. As Table 11 indicates, distribution is shared between social marketing organizations and the commercial sector.

TABLE 11: ESTIMATED CURRENT TANZANIA PRIVATE SECTOR MARKET VOLUME AND VALUE OF EMERGENCY CONTRACEPTION.

Sector	Annual doses (2022)	Annual Revenue (2022)
Nepal CRS Company	1,122,000	\$673,000
Estimated market share (50%)		
Total		\$1,347,000

Potential Market Value Increase

Using the current private sector method mix in Nepal, Table 12 shows that if Nepal had a private sector utilization rate similar to Bangladesh or the Philippines, the estimated private market for the four methods of contraceptives in 2025 would be between \$1,298,000 to \$1,929,000 larger. This increase results from more public sector contraceptive users switching to private sector sources and from

current non-users of modern contraceptives, including those with an unmet need and those using a traditional method, choosing to adopt and/or source their modern contraceptives from private sources.

TABLE 12: ESTIMATED POTENTIAL INCREASE IN NEPAL'S PRIVATE SECTOR CONTRACEPTIVE MARKET VOLUME AND VALUE.

Contraceptive Product	Estimated potential increase in number of private sector clients (2025)		Estimated potential private sector product volume increase (2025)*		Estimated potential private sector product value increase (2025)*	
	Low	High	Low	High	Low	High
Injectable contraceptives	36,000	54,000	146,000	216,000	\$88,000	\$130,000
Oral contraceptive pills	30,000	44,000	443,000	659,000	\$266,000	\$395,000
Male condoms	44,000	65,000	5,265,000	7,825,000	\$855,000	\$1,271,000
Implants	8,000	13,000	8,000	13,000	\$89,000	\$132,000
Total					\$1,298,000	\$1,929,000

*The estimated potential product volume and value increase with the conversion of new private sector clients to achieve at least one CYP following the assumptions described in the earlier section, except for implants.

Estimated Total Market Value

Nepal's total private sector market value for the four contraceptive methods of interest in 2025 was calculated by adding the current market values with those potential new revenues from a more enabling environment and appropriate interventions, using the current private sector method mix. Table 13 shows the estimated market value under these circumstances, which suggests a potential increase of between 20% to 30% of the current market value.

TABLE 13: ESTIMATED TOTAL PRIVATE SECTOR MARKET VALUE.

Contraceptive Product	Estimated annual private sector product value (2025)	Estimated potential private sector product value increase (2025)*		Estimated total value (2025)*	
		Low	High	Low	High
Injectable contraceptives	\$436,000	\$88,000	\$130,000	\$522,000	\$565,000
Oral contraceptive pills	\$1,327,000	\$266,000	\$395,000	\$1,593,000	\$1,722,000
Male condoms	\$4,267,000	\$855,000	\$1,271,000	\$5,123,000	\$5,539,000
Implants	\$445,000	\$89,000	\$132,000	\$534,000	\$577,000

Total	\$7,772,000	\$8,403,000
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*The estimated potential private sector value increase with the conversion of new private sector clients to achieve at least one CYP following the assumptions described in the earlier section, except for implants.

Potential Market Value Increase under a hypothetical change to Nepal’s private sector method mix

Using the hypothetical scenario of expanding the use of DMPA-SC, we estimated the effects DMPA-SC expansion by applying proportional changes seen in Uganda’s method mix between 2016 and 2022 to Nepal’s current private sector method mix, as described in the earlier section. Table 14 shows that if Nepal has the estimated change in private sector method mix and a private sector utilization rate similar to Bangladesh or the Philippines, the estimated private market for contraceptives in 2025 would be between \$1,142,000 and \$1,699,000 larger.

TABLE 14: ESTIMATED POTENTIAL INCREASE IN NEPAL’S PRIVATE SECTOR CONTRACEPTIVE MARKET VOLUME AND VALUE.

Contraceptive Product	Estimated potential increase in number of private sector clients (2025)		Estimated potential private sector product volume increase (2025)*		Estimated potential private sector product value increase (2025)*	
	Low	High	Low	High	Low	High
Injectables (DMPA-IM)	15,000	22,000	59,000	88,000	\$35,000	\$53,000
Injectables (DMPA-SC)	24,000	36,000	96,000	143,000	\$58,000	\$86,000
Oral contraceptive pills	29,000	44,000	436,000	647,000	\$262,000	\$388,000
Male condoms	33,000	48,000	3,894,000	5,788,000	\$633,000	\$941,000
Implants	15,000	22,000	15,000	22,000	\$155,000	\$232,000
Total					\$1,142,000	\$1,699,000

*The estimated potential private sector value increase with the conversion of new private sector clients to achieve at least one CYP following the assumptions described in the earlier section, except for implants.

Estimated Hypothetical Total Market Value

The hypothetical Nepal’s total private sector market value for the four contraceptive methods of interest was calculated by adding the current market values (with current private sector method mix) with those potential new revenues from a more enabling environment and appropriate interventions, and applying proportional changes seen in Uganda’s method mix between 2016 and 2022 to Nepal’s current private sector method mix. Table 15 shows the estimated hypothetical market value under these circumstances in 2025.

TABLE 15: ESTIMATED HYPOTHETICAL TOTAL PRIVATE SECTOR MARKET VALUE WITH THE EXPANSION OF DMPA-SC.

Contraceptive Product	Estimated annual private sector product value (2025)	Estimated potential private sector product value increase (2025)*		Estimated total value (2025)*	
		Low	High	Low	High
Injectables (DMPA-IM)	\$433,000	\$35,000	\$53,000	\$468,000	\$485,000
Injectables (DMPA-SC)	\$3,000	\$58,000	\$86,000	\$60,000	\$88,000
Oral contraceptive pills	\$1,327,000	\$262,000	\$388,000	\$1,589,000	\$1,715,000
Male condoms	\$4,267,000	\$633,000	\$941,000	\$4,900,000	\$5,208,000
Implants	\$445,000	\$155,000	\$232,000	\$599,000	\$676,000
Total				\$7,617,000	\$8,173,000

Potential Market Value Increase under the policy scenario of barriers removed to enable private sector provision of LARCs and implants increase popularity to Nepal’s private sector method mix

Using the policy scenario of having varriers removed for increased private sector provision of LARCs and implants increase popularity, we estimated the corresponding private sector method mix, as described in the earlier section. Table 16 shows that if Nepal has the estimated change in private sector method mix and a private sector utilization rate similar to Bangladesh or the Philippines, the estimated private market for contraceptives in 2025 would be between \$1,268,000 and \$1,885,000 larger.

TABLE 16: ESTIMATED INCREASE IN NEPAL’S PRIVATE SECTOR CONTRACEPTIVE MARKET VOLUME AND VALUE UNDER THE POLICY SCENARIO.

Contraceptive Product	Estimated potential increase in number of private sector clients (2025)		Estimated potential private sector product volume increase (2025)*		Estimated potential private sector product value increase (2025)*	
	Low	High	Low	High	Low	High
Injectables (DMPA-IM)	23,000	35,000	93,000	138,000	\$56,000	\$83,000
Injectables (DMPA-SC)	100	200	600	900	\$400	\$500
Oral contraceptive pills	19,000	28,000	285,000	424,000	\$171,000	\$254,000
Male condoms	28,000	42,000	3,389,000	5,037,000	\$551,000	\$819,000
Implants	47,000	69,000	47,000	69,000	\$490,000	\$729,000

Total	\$1,268,000	\$1,885,000
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*The estimated potential private sector value increase with the conversion of new private sector clients to achieve at least one CYP following the assumptions described in the earlier section, except for implants.

Estimated Policy Scenario's Total Market Value

The estimated policy scenario's Nepal's total private sector market value for the four contraceptive methods of interest in 2025 was calculated by adding the current market values (with current private sector method mix) with those potential new revenues from a more enabling environment for LARCs, increased in implant popularity, and appropriate interventions. Table 17 shows the estimated policy scenario's total market value under these circumstances in 2025.

TABLE 17: ESTIMATED TOTAL PRIVATE SECTOR MARKET VALUE UNDER THE POLICY SCENARIO.

Contraceptive Product	Estimated annual private sector product value (2025)	Estimated potential private sector product value increase (2025)*		Estimated total value (2025)*	
		Low	High	Low	High
Injectables (DMPA-IM)	\$433,000	\$56,000	\$83,000	\$488,000	\$515,000
Injectables (DMPA-SC)	\$3,000	\$400	\$500	\$3,000	3,000
Oral contraceptive pills	\$1,327,000	\$171,000	\$254,000	\$1,498,000	\$1,581,000
Male condoms	\$4,267,000	\$551,000	\$819,000	\$4,818,000	\$5,086,000
Implants	\$445,000	\$490,000	\$729,000	\$935,000	\$1,174,000
Total				\$7,743,000	\$8,359,000

Discussion

Utility of the approach

The resulting estimates were shared with a group of private sector stakeholders in Nepal during a workshop in March 2024. The information was well received and stimulated discussions about the potential of the private sector in Nepal in enhancing access to contraceptives.

Knowing the market size and potential market size by market actors alone is not sufficient to increase the availability, access, and uptake of modern contraceptives in the private sector. However, these estimates can help to facilitate conversations to identify important barriers and further the understanding of different enabling and constraining market forces to the uptake of contraceptive products in Nepal. Regular engagement with key market actors (e.g., government, donors, implementing partners, etc.) working towards a common vision of the market can help optimize the delivery of contraception across both public and private channels.

Replicability

The potential replicability of this novel method for estimating the geographic distribution, size, and value of the private market for key contraceptive products in Nepal is promising. All of the data utilized in these analyses are freely accessible, and we employed the free software environment for statistical computing and graphics, R, for producing the small area estimations. Furthermore, the Methods section of this report provides a detailed account of how we combined various data sources. However, three key limiting factors deserve consideration before attempting to reproduce these analyses. First, in light of known limitations in DHS survey data concerning ECP, obtaining access to distributor and wholesaler sales data for ECP and their market share is necessary to precisely estimate the present market volume and value for this product. Second, the analyst must be given price data for all the included contraceptive products to ensure an accurate estimation of the private market value. Discrepancies in pricing, such as wholesale versus retail prices, can significantly alter the market's estimated value. Last, the subnational estimations require proficiency in the R programming language and an understanding of Bayesian small area estimation techniques. Addressing each of these considerations entails making specific assumptions regarding the data's nature. These assumptions should be discussed and understood not only by the research team but also by the intended audience.

Other potential uses of the approach

The methodology can be adopted and applied to meet various stakeholders' diverse purposes and information needs. Given the availability of DHS and census in multiple countries, small area estimation can be applied to additional FP indicators tailored for other audiences, including local policymakers who

must plan, monitor, and evaluate local-level activities and implementing organizations who need to be able to identify underserved geographical areas to improve programming and advocacy. FP indicators may also be combined with socio-demographic data to better estimate the size of underserved populations sub-nationally. In addition to FP, the methodology can also be applied to understand other aspects of child, adolescent, and maternal health commonly measured in national household surveys, including malaria, malnutrition, immunization, teenage pregnancies, stillbirths, and antenatal care.^{43–45}

Although the methodology relies on household surveys and population data, other routine data sources such as stock, retail audit, or service data may also be incorporated to increase precision.³ Furthermore, as national surveys are periodic, consistent routine data from both the private and public sectors can provide an early indication of trends in product and service use.

Amid its varying uses, these analytic outputs require local contextualization to ensure appropriate customization for the specific purpose and audience. For instance, the rationale for estimating the number of contraceptive users obtained from the public sector with financial capacity was designed to approximate the potential capability to pay for contraceptive products in the private sector. Application of the methodological approach in other settings will require discussions with local stakeholders to determine if the indicators and associated assumptions are applicable and if additional contextualization is needed.

Limitations

Our approach has several limitations. First, estimates of some modern contraceptive methods that have a low proportion of use (e.g., implants in the private sector) may lack precision, especially for young women (results included in annex). Second, there is limited evidence available on any appropriate interventions for increasing modern contraceptive use among women identified as having an unmet need for contraception whose husbands were away. The accepted unmet need definition applied may not be reflective of the contraceptive need of these women. Third, not all the interpersonal communication intervention components from the identified studies may be applicable for the private sector in Nepal, and the effects in increasing modern method use will likely differ especially when targeted for women with an unmet need for contraception and women using a traditional contraceptive method. Fourth, due to measurement challenges around ECP, we were unable to provide an estimate for the potential market using this method. Fifth, as the sample of DHS survey was designed to include general population, estimates from DHS survey on male condom use did not include those from key populations. Hence, our estimates of male condom use, volume, and value did not include use from the key populations. Lastly, the market value estimations produced were based on retail surveys conducted in urban areas in Nepal, which are not necessarily representative of national retail prices of the various brands of contraceptive products in the country.

Conclusion and next steps

Private sector actors in the contraceptive product market in Nepal have a critical need for accurate and comprehensive market intelligence data. This information is essential not only for understanding the size and geographic distribution of their existing clientele but also for identifying potential new clients. By harnessing the power of robust market intelligence, these organizations can optimize their product targeting strategies and resource allocation, ultimately enabling them to better serve the diverse needs of their clients. FHM Engage has the important task of facilitating this process, thereby promoting increased contraceptive utilization in Nepal. However, the challenge lies in the often sparse or poor-quality nature of the market data, underscoring the pressing need for a novel estimation approach to better estimate market size.

Our novel approach to producing market sizing information for the private sector contraceptive market in Nepal utilizes Bayesian small area estimation methods in combination with nationally representative data. This innovative methodology enables us to generate subnational estimates, offering insights at either the district or provincial level, for a range of key contraceptive utilization indicators. By combining these subnational rates with population metrics, we enabled a deeper understanding of the geographical distribution of contraceptive users in Nepal. Additionally, our approach provides national-level estimates of both client and product volumes, shedding light on the value of the private sector market for key contraceptive products. The static images of our small area estimation maps and market volume and value tables are featured in an accompanying PowerPoint presentation and this report. Metrics for Management will also produce a user-friendly application to dynamically visualize the data, found on its website. This will facilitate the discovery of new insights as users toggle between and scroll across detailed, information-rich maps, as well as interactive tables that would empower users to learn more about potential changes in the contraceptive market environment as they explore various market scenarios, making it easier to delve into the data and its implications.

While prior studies have noted the shortcomings of using DHS to estimate ECP use, consultations with private sector stakeholders and subsequent reviews of private sector distribution data made evident that Nepal DHS data significantly underestimates ECP usage. This underestimation may stem from respondents' interpretation of "current" user status.⁴⁰ Given that ECP is not used during every sexual encounter or regularly, women may not report themselves as current users. Consequently, the mismeasurement of ECP results in inaccurate usage estimates that fail to capture the true extent of ECP users. From programmatic and policy perspectives, this undercounting could lead to inadequate investments in ensuring its accessibility. Underinvestment would impact those most likely to use ECP, such as unmarried sexually active women and women in their early twenties.^{42,46,47} This is also evident by the sales data from Nepal CRS company, which shows a drastic increase in ECP over the last five years. Based on reported private sector sales volume, underestimations in ECP also present a major obstacle

to clearly understanding the important role the private sector plays in its provision and the use of ECP by women identified as having an unmet need for contraception. One of the key pieces of feedback received from the dissemination workshop with private sector stakeholders in Nepal is the continued need for market intelligence and improved data around ECP use. To gain a more systematic accurate understanding of the size of the population who uses ECP, their pattern of usage, and where they obtain the method, it is imperative to identify alternative measurement approaches that accurately capture these aspects. Further research may include a systematic review of the literature on measurement methods of ECP, as well as research in understanding the preference and actual contraceptive needs of women identified as having an unmet need using the accepted definition. FHM Engage can advance the understanding of this important group of women and their actual contraceptive needs and offer private markets new tools to understand their role in serving this area of reproductive health.

Sensitivity analyses comparing our estimated private sector volume showed comparable volume estimates on male condoms and oral contraceptive pills, except for injectables. However, the applicability of the issues identified in estimating ECP use in the DHS survey question described above for estimating injectable use is likely limited. More detailed sales data including subnational distribution may be helpful to identify if the scale of underestimation is the same across the country. Additional comparison with other data sources, such as the volume of various types of contraceptives consumed in the public sector, may also provide insights into the discrepancies. Since injectables are among the most commonly used contraceptive products in Nepal, resolving the discrepancies in estimated volume would be essential in ensuring accurate market size estimation.

In conclusion, this innovative approach has generated valuable market intelligence insights, shedding light on the private sector contraceptive market in Nepal. The success of this approach suggests its potential applicability in other FHM Engage partner countries and across various global health domains where market data is limited, promising enhanced insights to drive positive change and optimize service delivery in diverse regions and health sectors worldwide.

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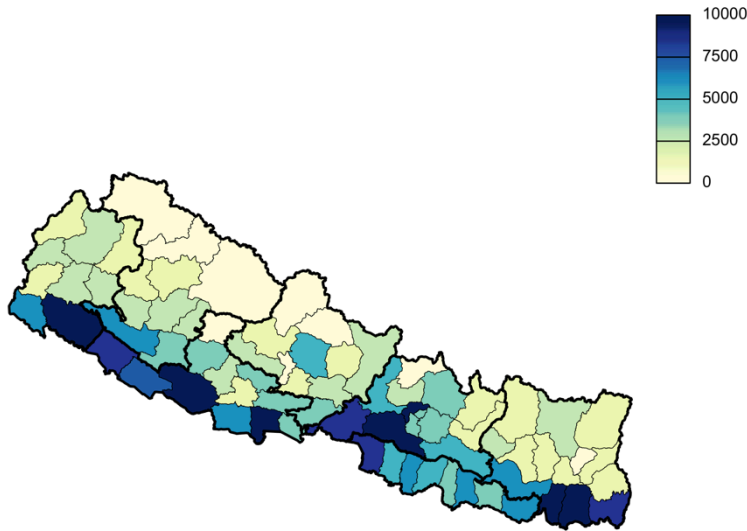
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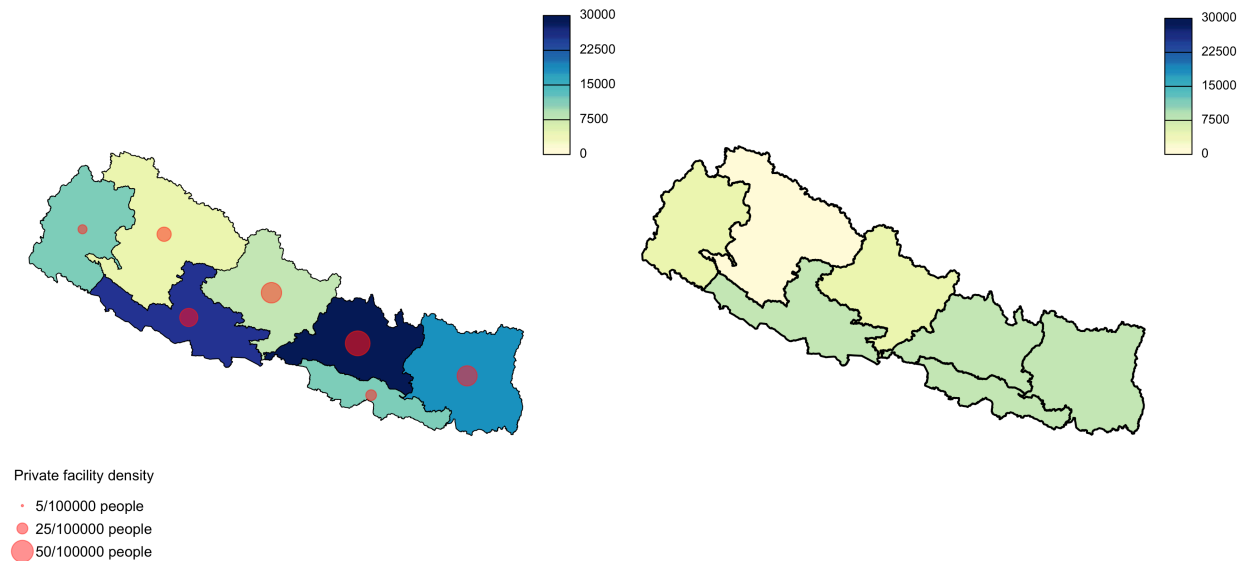
Annex I. Subnational maps of indicators for young women aged 15 to 24

- Current modern contraceptive users



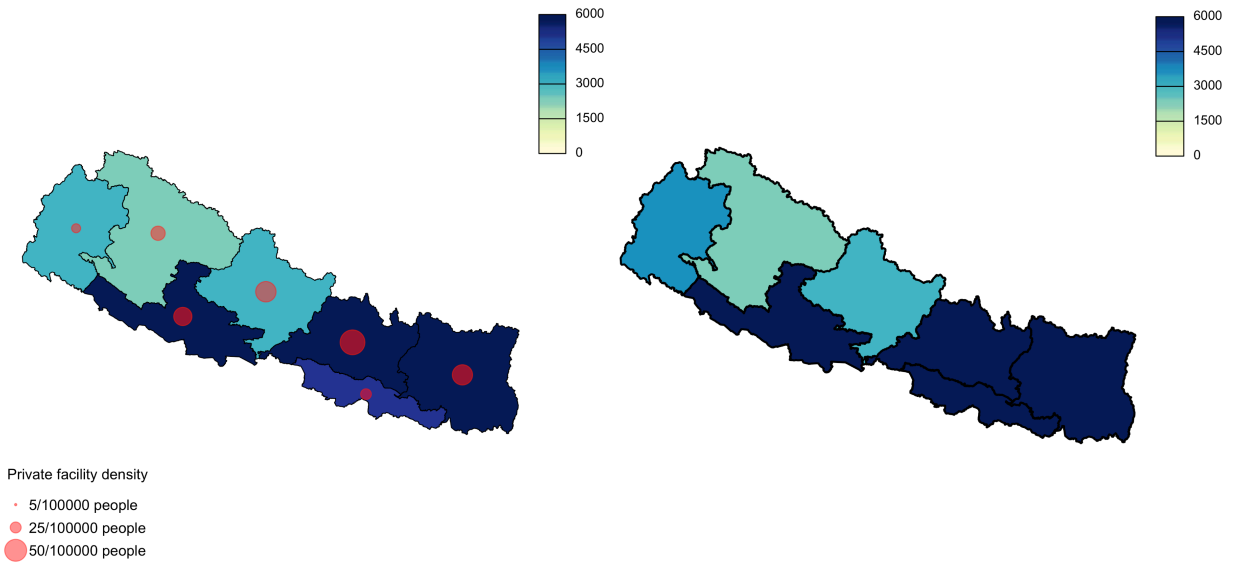
FIGURES 10: NUMBER OF YOUNG WOMEN USING A MODERN CONTRACEPTIVE METHOD BY DISTRICT.

- Current modern contraceptive users – Short-term methods



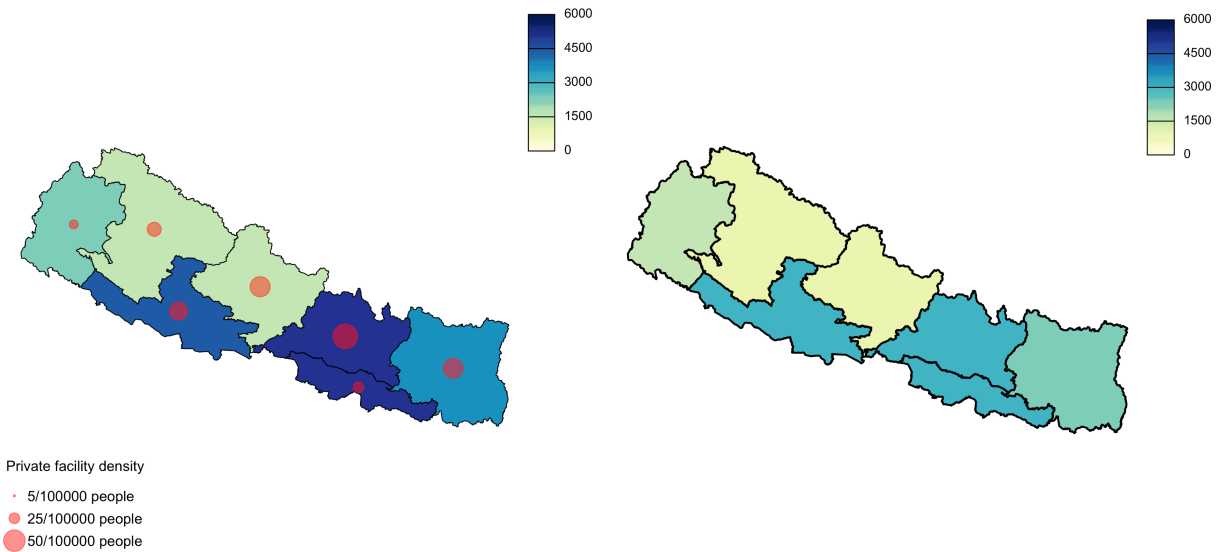
FIGURES 11: NUMBER OF YOUNG WOMEN USING SHORT-TERM CONTRACEPTIVE METHODS A) FROM A PRIVATE SECTOR SOURCE OVERLAYED WITH PRIVATE SECTOR FACILITY DENSITY (LEFT), B) FROM A PUBLIC SECTOR SOURCE WITH FINANCIAL CAPACITY BY REGION (RIGHT).

- Current modern contraceptive users – Injectable contraceptives



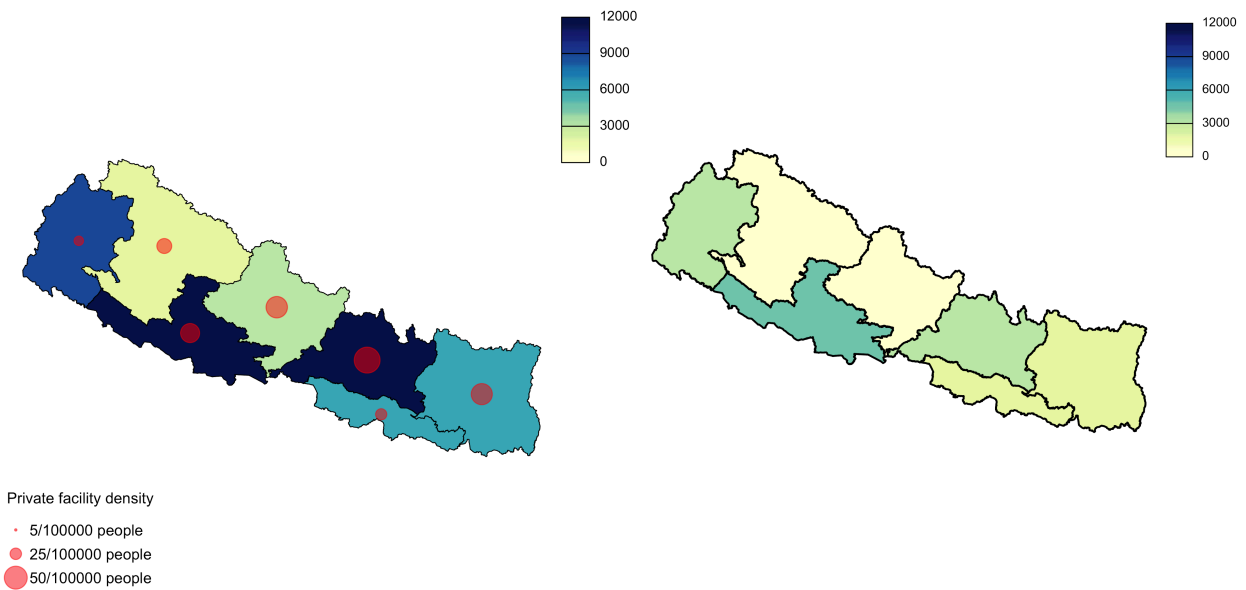
FIGURES 12: NUMBER OF YOUNG WOMEN USING INJECTABLE CONTRACEPTIVES A) FROM A PRIVATE SECTOR SOURCE OVERLAYED WITH PRIVATE HEALTH FACILITY DENSITY (LEFT), B) FROM A PUBLIC SECTOR SOURCE WITH FINANCIAL CAPACITY BY REGION (RIGHT).

- Current contraceptive method users – Oral contraceptive pills



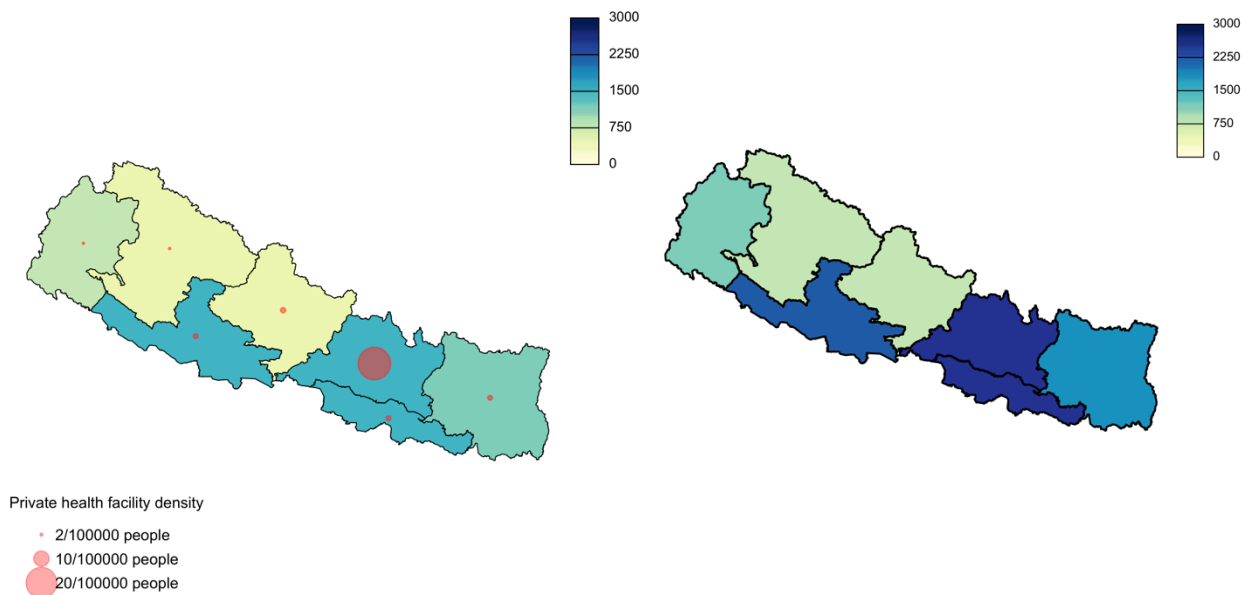
FIGURES 13: NUMBER OF YOUNG WOMEN USING ORAL CONTRACEPTIVE PILLS A) FROM A PRIVATE SECTOR SOURCE OVERLAYED WITH PRIVATE HEALTH FACILITY AND PHARMACY DENSITY (LEFT), B) FROM A PUBLIC SECTOR SOURCE WITH FINANCIAL CAPACITY BY REGION (RIGHT).

- Current contraceptive method users – Male condoms



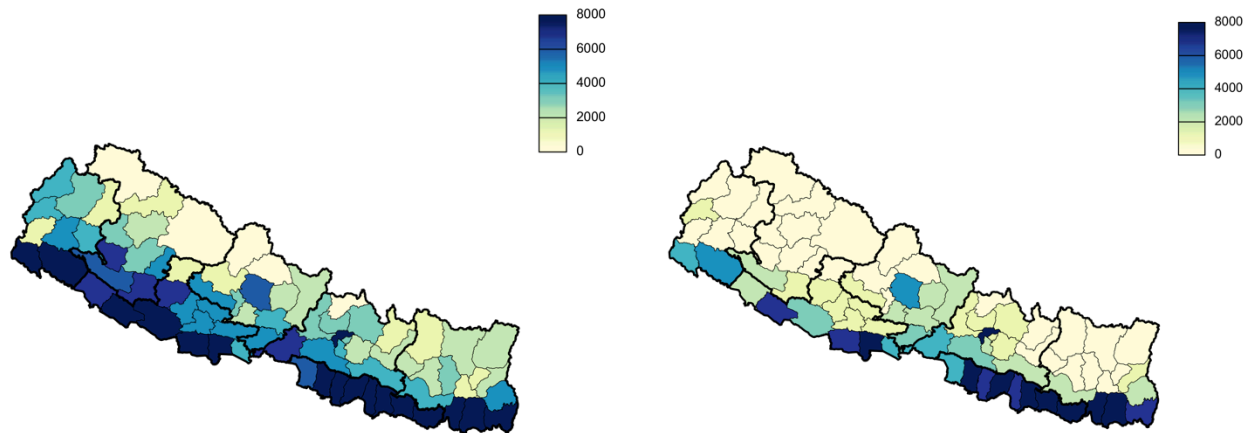
FIGURES 14 NUMBER OF YOUNG WOMEN USING LARCS A) FROM A PRIVATE SECTOR SOURCE OVERLAYED WITH PRIVATE HEALTH FACILITY DENSITY (LEFT), B) FROM A PUBLIC SECTOR SOURCE WITH FINANCIAL CAPACITY BY REGION (RIGHT).

- Current contraceptive method users – implants



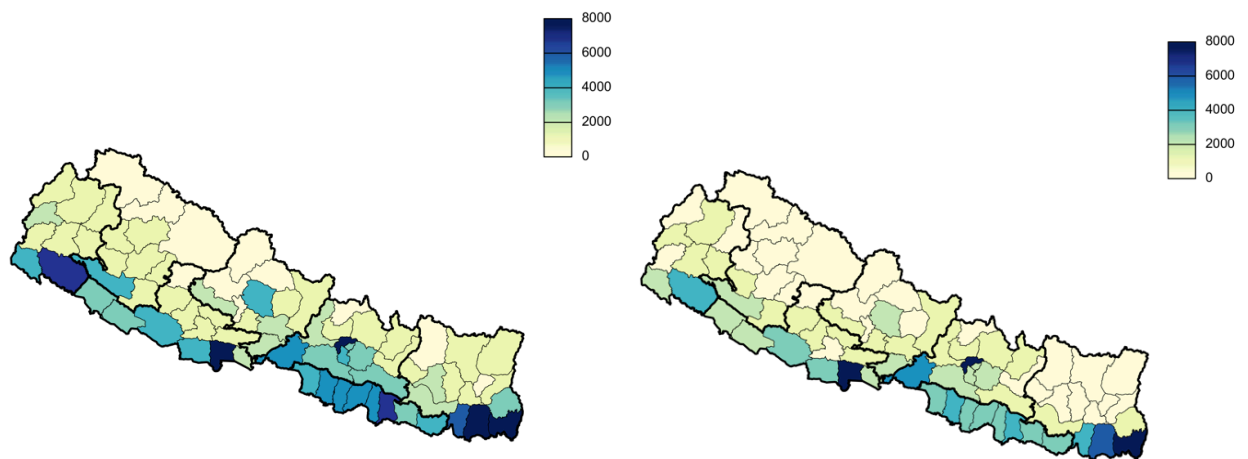
FIGURES 15: NUMBER OF YOUNG WOMEN USING IMPLANTS A) FROM A PRIVATE SECTOR SOURCE OVERLAYED WITH PRIVATE HEALTH FACILITY DENSITY (LEFT), B) FROM A PUBLIC SECTOR SOURCE WITH FINANCIAL CAPACITY BY REGION (RIGHT).

- Potential modern contraceptive users – young women with an unmet need



FIGURES 16: NUMBER OF YOUNG WOMEN A) WITH AN UNMET NEED FOR CONTRACEPTION (LEFT), B) WITH AN UNMET NEED FOR CONTRACEPTION WITH FINANCIAL CAPACITY (RIGHT).

- Potential modern contraceptive users – young women using a traditional method



FIGURES 17: NUMBER OF YOUNG WOMEN A) USING A TRADITIONAL METHOD (LEFT), B) USING A TRADITIONAL METHOD WITH FINANCIAL CAPACITY BY DISTRICT.

Annex 2. Private market volume and value estimates for young women aged 15 to 24

TABLE 17: ESTIMATED CURRENT NEPAL PRIVATE SECTOR CONTRACEPTIVE MARKET VOLUME AND VALUE AMONG YOUNG WOMEN.

Contraceptive Product	Estimated number of current private sector client (2025)	Estimated annual private sector product volume (2025)	Estimated annual private sector product value (2025)
Injectable methods	36,000	144,000	\$86,000
Oral contraceptive pills	27,000	403,000	\$242,000
Male condoms	49,000	5,867,000	\$953,000
Implants	6,000	6,000	\$67,000
Total			\$1,348,000

TABLE 18: ESTIMATED POTENTIAL INCREASE IN NEPAL PRIVATE SECTOR CONTRACEPTIVE MARKET VOLUME AND VALUE AMONG YOUNG WOMEN.

Contraceptive Product	Estimated potential increase in number of private sector clients (2025)		Estimated potential private sector product volume increase (2025)*		Estimated potential private sector product value increase (2025)*	
	Low	High	Low	High	Low	High
Injectable contraceptives	7,300	11,800	29,000	47,000	\$18,000	\$28,000
Oral contraceptive pills	5,500	8,800	82,000	132,000	\$49,000	\$79,000
Male condoms	10,000	16,000	1,199,000	1,925,000	\$195,000	\$313,000
Implants	1,300	2,100	1,300	2,100	\$14,000	\$22,000
Total					\$276,000	\$443,000

*The estimated potential product volume and value increase with the conversion of all new private sector clients to achieve at least one CYP following the assumptions described in the earlier section.

TABLE 19: ESTIMATED TOTAL NEPAL PRIVATE SECTOR CONTRACEPTIVE MARKET VOLUME AND VALUE AMONG YOUNG WOMEN.

Contraceptive Product	Estimated annual private sector product value (2025)	Estimated potential private sector product value increase (2025)*		Estimated total value (2025)*	
		Low	High	Low	High
Injectable contraceptives	\$86,000	\$18,000	\$28,000	\$104,000	\$115,000
Oral contraceptive pills	\$242,000	\$49,000	\$79,000	\$291,000	\$321,000
Male condoms	\$953,000	\$195,000	\$313,000	\$1,148,000	\$1,266,000
Implants	\$67,000	\$14,000	\$22,000	\$81,000	\$89,000
Total				\$1,624,000	\$1,791,000

*The estimated potential private sector value increase with the conversion of all new private sector clients to achieve at least one CYP following the assumptions described in the earlier section.

TABLE 20: ESTIMATED POTENTIAL INCREASE IN NEPAL PRIVATE SECTOR CONTRACEPTIVE MARKET VOLUME AND VALUE AMONG YOUNG WOMEN UNDER HYPOTHETICAL CHANGE TO NEPAL'S PRIVATE SECTOR METHOD MIX.

Contraceptive Product	Estimated potential increase in number of private sector clients (2025)		Estimated potential private sector product volume increase (2025)*		Estimated potential private sector product value increase (2025)*	
	Low	High	Low	High	Low	High
Injectables (DMPA-IM)	2,300	3,800	9,400	15,200	\$6,000	\$9,000
Injectables (DMPA-SC)	3,800	6,100	15,000	24,500	\$9,000	\$15,000
Oral contraceptive pills	4,600	7,400	69,000	111,000	\$42,000	\$67,000
Male condoms	5,200	8,300	619,000	994,000	\$101,000	\$162,000
Implants	2,400	3,800	2,400	3,800	\$25,000	\$40,000
Total					\$182,000	\$292,000

*The estimated potential private sector value increase with the conversion of all new private sector clients to achieve at least one CYP following the assumptions described in the earlier section.

TABLE 21: ESTIMATED ALTERNATIVE TOTAL PRIVATE SECTOR MARKET VALUE AMONG YOUNG WOMEN WITH THE HYPOTHETICAL CHANGE TO NEPAL'S PRIVATE SECTOR METHOD MIX.

Contraceptive Product	Estimated annual private sector product value (2025)	Estimated potential private sector product value increase (2025)*		Estimated total value (2025)*	
		Low	High	Low	High
Injectables (DMPA-IM)	\$86,000	\$6,000	\$9,000	\$92,000	\$95,000
Injectables (DMPA-SC)	\$0	\$9,000	\$15,000	\$9,000	\$15,000
Oral contraceptive pills	\$242,000	\$42,000	\$67,000	\$283,000	\$308,000
Male condoms	\$953,000	\$101,000	\$162,000	\$1,054,000	\$1,115,000
Implants	\$67,000	\$25,000	\$40,000	\$92,000	\$107,000
Total				\$1,530,000	\$1,640,000

TABLE 22: ESTIMATED INCREASE IN NEPAL'S PRIVATE SECTOR CONTRACEPTIVE MARKET VOLUME AND VALUE AMONG YOUNG WOMEN UNDER THE POLICY SCENARIO.

Contraceptive Product	Estimated potential increase in number of private sector clients (2025)		Estimated potential private sector product volume increase (2025)*		Estimated potential private sector product value increase (2025)*	
	Low	High	Low	High	Low	High
Injectables	3,700	5,900	14,000	23,000	\$9,000	\$14,000
Oral contraceptive pills	3,000	5,000	45,000	73,000	\$27,000	\$44,000
Male condoms	4,500	7,200	539,000	865,000	\$88,000	\$141,000
Implants	7,400	12,000	7,400	12,000	\$78,000	\$125,000
Total					\$202,000	\$324,000

*The estimated potential private sector value increase with the conversion of all new private sector clients to achieve at least one CYP following the assumptions described in the earlier section.

TABLE 23: ESTIMATED TOTAL PRIVATE SECTOR MARKET VALUE UNDER THE POLICY SCENARIO AMONG YOUNG WOMEN.

Contraceptive Product	Estimated annual private sector product value (2025)	Estimated potential private sector product value increase (2025)*		Estimated total value (2025)*	
		Low	High	Low	High
Injectable contraceptives	\$86,000	\$9,000	\$14,000	\$95,000	\$101,000
Oral contraceptive pills	\$242,000	\$27,000	\$44,000	\$269,000	\$285,000
Male condoms	\$953,000	\$88,000	\$141,000	\$1,041,000	\$1,094,000
Implants	\$67,000	\$78,000	\$125,000	\$145,000	\$192,000
Total				\$1,550,000	\$1,672,000

About FHM Engage

Frontier Health Markets (FHM) Engage is a five-year cooperative agreement (7200AA21CA00027) funded by the United States Agency for International Development. We work to improve the market environment for greater private sector participation in the delivery of health products and services and to improve equal access to and uptake of high-quality consumer driven health products, services, and information. Chemonics International implements FHM Engage in collaboration with Core Partners: Results for Development (co-technical lead), Pathfinder and Zenysis. FHM Engage Network Implementation Partners include ACCESS Health India, Africa Christian Health Association Platform, Africa Healthcare Federation, Amref Health Africa, Ariadne Labs, CERRHUD, Insight Health Advisors, Makerere University School of Public Health, Metrics for Management, Solina Group, Strategic Purchasing Africa Resource Center, Scope Impact, Stage Six, Strathmore University, Total Family Health Organization, and Ubona Institute.

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