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# Where are Iraq's Poor:
# Mapping Poverty in Iraq

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# 1 Introduction

Measuring poverty and tracking it over time is an important prerequisite to national economic planning. Until recently, reliable information on the standard of living of all Iraqis was not forthcoming. Although household budget surveys were conducted in 1992/93 and 2002, they excluded the Kurdistan region. Absence of official data on household expenditure or poverty line hampered the ability of Iraqi policymakers to understand the extent of the problem, analyze their causes, and devise appropriate policies.

Iraq Household Socioeconomic Survey 2006/07 (IHSES) was the first survey of its kind since 1988 to cover all 18 governorates. The survey collected rich information on income, expenditure, employment, housing, education, health, and other socioeconomic indicators. It was followed by construction of an official poverty line and assessment of causes and consequences of poverty. IHSES 2006/07 also formed the basis for Iraq's National Strategy for Poverty Reduction 2009.

Building on the experience of the first IHSES survey and using international best practice on sampling and questionnaire design and survey implementation, the second round of IHSES was fielded in 2012/13. A nationally representative sample of more than 25,000 households from all 18 governorates was interviewed on multiple topics. A comprehensive assessment of household welfare and its determinants was completed in 2014 culminating in the report *The Unfulfilled Promise of Oil and Growth: Poverty, Inclusion, and Welfare in Iraq* (The World Bank, 2014).

Although national, regional, governorate, and qhada (district) level poverty rates can be estimated from the IHSES 2012/13 data, sampling design and sample size of the survey does not allow reliable and representative poverty estimates at the nahiya (sub-district) level. To fill this data gap, a larger survey was designed to collect information on correlates of household welfare like demographic characteristics, education, occupation, housing, and assets and estimate small-area poverty rates using projection methods. This report presents results from the exercise, the first of its kind for Iraq. Poverty mapping not only provides a visual representation of poverty at subnational levels, it also reveals pockets of poverty and islands of prosperity where they exist. This knowledge is useful to inform decisions on policy design and targeting of development projects and programs.

# 2 Poverty Mapping Methodology

## Survey-to-census imputation

Conventionally, the discussion and motivation for small area estimation is framed around imputation from survey to census. It combines the strengths of household budget survey and census to estimate poverty headcount and other indicators at small geographical areas. Budget surveys collect detailed information on household expenditure which yields average income, poverty headcount rate, and other welfare and inequality measures. The surveys usually allow subnational estimates at the first administrative level such as regions, provinces, or urban and rural areas. However, the sample size of the surveys is usually too small to make reliable statements at lower administrative units like districts, sub-districts, or census tracts. On the other hand, all households are interviewed in a census which mitigates the small sample problem. The downside is that information on income or expenditure is typically not collected in the census. Small area estimation involves modeling a relationship between expenditure and individual, household, and location characteristics in the survey and imposing the relationship on the census to estimate household expenditure. Of course, for this exercise to be possible, the variables used for modeling household expenditure must be common to the survey and the census.

We follow the small area estimation methodology developed by Elbers, Lanjouw and Lanjouw (2002) (2003) (henceforth ELL). The exercise proceeds in three steps. First, the variables common to survey and census are identified. These usually include demographic characteristics like age, gender, marital status, ethnicity, education, and occupation, dwelling characteristics like ownership and occupancy of dwelling, type of wall, roof, floor, kitchen, toilet, sewage, garbage disposal, lighting, cooking fuel, heating, and drinking water, and ownership of assets like livestock and poultry, agricultural land, agricultural equipments, electronic equipments, furniture, and vehicles.

Identifying the common set of variables is only the first step; they also have to be vetted for statistical comparability. For a variable to be used in modeling, the means of the variable, if not the distributions, must be statistically indistinguishable. Many variables have means that are statistically different from each other which makes them ineligible to be included in the model.

In the second step, household expenditure is regressed on the set of candidate variables as following:

$$ln(y_{ic}) = X_{ic}\beta + Z_c\gamma + u_{ic} \quad (1)$$

where $\ln(y_{ic})$ is the log of per capita expenditure of household $i$ in cluster $c$, $X_{ic}$ is the vector of household and cluster characteristics respectively, and $u_{ic}$ is the vector of disturbances with distribution $F(0,\Sigma)$. Efficient estimates of the betas are obtained by estimating the variance-covariance matrix of the error term ($\hat{\Sigma}$)and using generalized least squares (GLS) to estimate the parameters. One of the concerns in running regression (1) is whether or not household level variables can sufficiently capture the intra-cluster correlation of welfare, i.e, the correlation in household welfare due to cluster-specific characteristics. It is recommended that cluster level information be added to the regression, either from auxiliary data sources or by creating area-level average from the larger survey and merging it with the survey.

It is assumed that the error term consists of a location-specific component and a household-specific component that are independent of each other and uncorrelated to the observable characteristics:

$$u_{ic} = \eta_c + \varepsilon_{ic} \quad (2)$$

This specification allows for correlation in household expenditure within clusters and heteroskedasticity in the household component of the error term.[1]

To estimate the variance-covariance matrix $\hat{\Sigma}$, equation (1) is first estimated using Ordinary Least Squares (OLS) to obtain the residuals $\hat{u}_{ic}$. The location component is estimated as the mean of residuals within a cluster and the household component is estimated as the overall residual minus the location component as shown in equations (3) and (4):

$$\hat{\eta}_c = \frac{1}{n_c}\sum_{i=1}^{n_c}\hat{u}_{ic} \quad (3)$$

$$\hat{\varepsilon}_{ic} = (\hat{u}_{ic} - \hat{\eta}_c) \quad (4)$$

Heteroskedasticity in the household error component $\hat{\sigma}^2_{\varepsilon,ic}$ is modeled using a flexible logistic function and variance of the cluster effect $\hat{\sigma}^2_{\eta,c}$ is estimated nonparametrically allowing for heteroskedasticity in $\varepsilon_{ic}$. Having estimated $\hat{\sigma}^2_{\eta,c}$ and $\hat{\sigma}^2_{\varepsilon,ic}$ and thus $\hat{\Sigma}$, efficient estimates of the betas ($\hat{\beta}_{GLS}$) in equation (1) and their variance-covariance matrix $\hat{V}(\hat{\beta}_{GLS})$ are obtained from the GLS procedure.

In the third step, household welfare in the larger survey is estimated by drawing a vector of betas ($\tilde{\beta}$) from the multivariate normal distribution with mean $\tilde{\beta}$ and variance-covariance matrix $\hat{V}(\hat{\beta}_{GLS})$, a vector of location disturbance component $\tilde{\eta}_c$ from a distribution with mean 0 and variance $\hat{\sigma}^2_{\eta,c}$ and a vector of household error component $\tilde{\varepsilon}_{ic}$ from a normal distribution with mean 0 and variance $\hat{\sigma}^2_{\varepsilon,ic}$. Finally, these components are used to estimate the household expenditure for each household:

$$\ln(\tilde{y}_{ic}) = X_{ic}\tilde{\beta} + \tilde{\eta}_c + \tilde{\varepsilon}_{ic} \quad (5)$$

This procedure is repeated multiple times, often 100 or more, with the headcount rate and other welfare measures calculated for each round of simulation. The average over all the rounds of simulation is then reported as the point estimate and the standard error of the estimate is derived from the standard deviation of the measures. A key underlying assumption is that of stability of beta parameters, i.e., the estimated relationship

[1] The location-specific error component is assumed to be homoskedastic because the number of clusters in the household surveys is often too small to allow for heteroskedasticity.

between expenditure and household and individual characteristics do not change between the survey and the census.

There are three sources of error in the predicted welfare estimates. Idiosyncratic error is the error due to the difference in realized and expected consumption. Model error arises because of the possible bias in the estimated betas due to model misspecification. And computational error is the error inherent in obtaining the results through simulation. The smaller the area of interest, or the fewer the number of households per area, the larger is the idiosyncratic error. Thus idiosyncratic error can be reduced by imputing at higher level of aggregation. The only constraint to computation error is computational power as it declined with the number of simulations. Modeling error can be minimized by careful selection of variables, regression specifications, and the subgroups for which the model is estimated.

In a recent critique of the ELL methodology, Tarozzi and Deaton (2009) argue that it understates the standard error, and thus overstates the precision of the estimates, if there is correlation across clusters in an area. However, this is an empirical question and it is not necessarily true in every situation. Indeed, Elbers, Lanjouw, and Leite (2009) demonstrate using data from Brazil that the degree of understatement is minimal. The effect of correlation within and across clusters can be minimized by introducing area level means into the consumption model to capture cluster level heterogeneity.

Newer developments in the small area estimation literature extend the ELL method to obtain more efficient and consistent estimators. Molina and Rao (2010) propose empirical best (EB) method which improves the efficiency of point estimates by utilizing the available information on households in domains that are in both the survey and the census and Elbers and van der Weide (2014) add a nested error structure to the EB model to obtain a more consistent estimator than ELL.

## Survey-to-survey imputation

Iraq presents a unique challenge because recent census data is not available for the country. The last Iraqi census was in 1997 which excluded the three Kurdish governorates of Duhok, Sulaimaniya, and Erbil. Instead, imputation is done on a larger household survey designed explicitly to allow for small area estimation. We apply recent adaptation of the ELL methodology to predict poverty rate from one survey to another. The core methodology remains the same—build a consumption model using household expenditure survey and use it to predict consumption in other surveys. This is often used to predict poverty rate over time. Household expenditure surveys are conducted infrequently, usually every three to five years. The absence of data makes it difficult to estimate welfare trend in the intervening years. Nevertheless, if information on correlates of poverty is available for those years, poverty headcount and other welfare indicators can be estimated using the projection method. The assumption of stability of beta parameters becomes even more important for survey-to-survey imputation because the projection is often several years forward.

In addition to the conventional sources of error, a fourth source of error—sampling error—pertains to survey-to-survey exercise because imputation is done on survey data rather than census. Sampling error is assumed to be independent of other errors. Thus standard errors are larger than what they would be had census data been used. Sampling error in the prediction data was accounted for by exporting the simulated data to Stata and obtaining robust standard errors after "survey setting" the data, i.e., specifying household weight and strata and cluster variables.

# 3 Data

Imputation data for poverty mapping exercise comes from Iraq Poverty Mapping and Maternal Mortality Survey (I-PMM), a nationally representative survey of more than 300,000 households, conducted close on the heels of IHSES 2012/13. The objectives of I-PMM were twofold: to estimate maternal mortality rate and collect reliable information on socioeconomic indicators from a large number of households.

The I-PMM data has many advantages over a regular census data because it was designed explicitly to allow for small area estimation. The I-PMM questionnaire included the expected candidate variables for modeling and imputation. Detailed information on the size, composition, and structure of the households came from the household roster and the survey asked about other usual strong predictors of welfare like education and occupation of household members, characteristics of dwelling, and ownership of assets. In addition, distance from and time taken to the nearest facilities captured location-level differences which improved the prediction power of the regression models. Literature shows that the alteration of the wording of the question, response options, and ordering of the questions may affect survey responses and often it is not possible to anticipate the direction and size of such bias. Thus the questions in the I-PMM survey were adapted from IHSES with little modification. Oftentimes, there is a lag of many years between survey and census which strains the assumption of the stability of beta parameters. This was not an issue in Iraq because I-PMM was conducted immediately after IHSES 2012/13. Finally, to the extent that differences in survey implementation cause differences in data, this is less of a concern because both the surveys were conducted by the same team of Central Statistics Office (CSO) and Kurdistan Rregion Statistics Office (KRSO) staff and the two surveys were closely coordinated.

Information on household expenditure for poverty mapping comes from Iraq Household and Socioeconomic Survey (IHSES) 2012/13, a nationally representative income and expenditure survey in Iraq. Modeled after the Living Standard Measurement Surveys (LSMS), it collects detailed data on household income and expenditure, health and education, employment and job search, displacement, housing and access to services, and many other socioeconomic indicators from more 25,000 households.

Besides IHSES and I-PMM, two auxiliary data sources were explored to augment to the regression model: Multiple Indicator Cluster Survey (MICS) 2011 and Iraq Civil War Dataset from the Empirical Survey of Conflict (ESOC) study. MICS 2011 is a nationally representative household survey focusing on indicators of women's and children's wellbeing like marriage and birth history, child mortality, maternal and newborn health, contraception, HIV/AIDS, breastfeeding, early childhood development, immunization, care of illness among other indicators. Despite having a rich set of information, the MICS 2011 data could not be used due to its sample size. The survey interviewed a total of 36,580 households, implying that the sample size at qhada and nahiya levels were too small for calculation of area-level averages. The Iraq Civil War Dataset contains rich information on violent incidents between coalition forces and insurgents, civilian casualties, spending on reconstruction projects, oil and gas reserves, and election returns. However, the data could not be used in modeling because it does not identify new districts that have been defined since 2003.

In absence of auxiliary data, area-level average were calculated from I-PMM and merged with the IHSES data before including them in the regression model. Area-level means improve the precision of the predictions by capturing the differences in household standard of living due to location characteristics.

4

# Candidate Variables

The pool of variables common to the two surveys is as following:

**Demographic characteristics:** Gender, age, birthplace, marital status, household size, number of children, adults, and elderly in the household, dependency ratio

**Education:** Education level of the household head, highest level of education by any household member

**Occupation:** Employment status, occupation, sector of employment

**Housing characteristics:** Type of housing unit, main construction material of wall, total area of land and dwelling, ownership and occupancy status of dwelling, source of drinking water and electricity, type of sewage and toilet

**Productive and durable assets:** Ownership of cooler, refrigerator, freezer, electrical generator, cooker, television, washing machine, dishwasher, water heater, heater, electric fan, air conditioner, vacuum cleaner, motorcycle, car, and PC

**Location:** Distance from and time taken to the nearest school, hospital, health center, bank, bus stop, market, paved road, etc.

# 5 Modeling

The level at which regression models are run must be chosen judiciously. If a single model is specified for the entire country, the implicit assumption is that the parameter estimates on the regressors are the same for all regions of the country. In other words, a national model assumes that the relationship between household expenditure and household characteristics are uniform throughout the country. This may not be a tenable assumption in a country like Iraq with wide spatial heterogeneity in incidence of violence, endowment of natural resources, and robustness of factor markets. For example, returns to education are likely higher in Baghdad where formal job market is more robust than in the poorest governorates with thin labor markets. Fitting separate models by region allows the relationship between expenditure and the explanatory variables to vary and it reduces the standard error of poverty prediction due to the error in modeling. An alternative way to allow the coefficients to vary by region is to interact the variables with regional dummy variables in the regression. This approach is flexible enough to allow differential relationships across regions and also minimizes the chances of overfitting.

In this exercise, we proceeded in a top-down fashion to decide the level at which to model the relationship, starting from a national-level regression. The national model yielded accurate prediction for the whole of Iraq but the model could not capture the heterogeneity across governorates reflected by poor governorate level predictions compared to direct estimates from IHSES. In the next iteration, three regional models were fitted, one each for Baghdad, Kurdistan (Duhok, Sulaimaniya, and Erbil) and Rest of Iraq (14 governorates). Accurate predictions were obtained for Baghdad and the three Kurdistan governorates but the third model was still not flexible enough to capture the differences across 14 governorates. Next, five division-level models were run for Baghdad, Kurdistan, North (Nainawa, Kirkuk, and Salah ad-Din), Centre (Anbar, Diyala, Najaf, Kerbela, Wasit, and Babylon) and South (Qadisiya, Thi-Qar, Muthana, Maysan, and Basrah). The governorate level predictions from the division level regressions were not satisfactorily close to the IHSES estimates in the North, Centre, and South.

Finally, one model for each governorate was run. One concern with running multiple models is the loss in degrees of freedom and the risk of overfitting, i.e., the models are forced to explain the

noise in the data in small sample. To avoid the problem of overfitting, researchers recommended that the sample size be no smaller than 300 for each regression (Ahmed, Dorji, Takamatsu, & Yoshida, 2014). By this criterion, governorate level regressions were feasible because the governorate with the smallest sample size was Kerbela with 612 households. An important implication of running governorate-level regressions is that the variables must be comparable at the level of the governorates; a variable that is statistically indistinguishable at the national level may nevertheless be different for a particular governorate. Thus only those variables whose averages are statistically similar within governorates are used in each model.

Appendix B presents the results for each GLS model. The variables that consistently feature as significant predictors of household expenditure are education level and sector of employment of the household head, household size, age composition of the household, and ownership of durable goods like washing machine, water heater, and vacuum cleaner. This is consistent with general intuition about correlates of welfare and it jibes with the findings of the poverty assessment report as well. Nevertheless, one should be cautious in interpreting the regression coefficients as causal estimates. Unlike general regression analysis, the purpose of these regression models are not to explain the causes of household welfare and obtain parameter estimates on explanatory variables. The models are simply derived for accurate prediction of per capita expenditure. It is entirely possible that some important variables for causal analysis are missing from the regression either because they are not available in both the datasets or they are statistically not similar. In such situations, the parameter estimates will be biased if there is a correlation between included and omitted variables. It is even possible for a variable to be significant in the opposite direction than what one would expect by intuition or theory.

6

# Poverty Lines

The poverty line in Iraq is derived from the cost of basic need approach. It is defined as the level of food expenditure necessary for minimum caloric intake and non-food expenditure necessary to maintain a minimum acceptable standard of living. The official poverty line is defined nationally according to the patterns and distribution in non-food consumption in the national sample. Although it uses a single bundle of goods, it adjusts for spatial prices differences. To account for differences in tastes and habits in consumption, regional poverty lines for Kurdistan, Baghdad, and Rest of Iraq were also constructed at the request of the Iraqi government. Unlike the national poverty line, regional lines are derived based on consumption patterns within the region. The national and regional poverty lines are shown in Table 1.

To be consistent with the official poverty estimates which are calculated using the unique national poverty line, national poverty line is used for simulation in this exercise. A larger point is that for the purpose of poverty mapping, the choice of poverty line is not crucial. The goal of poverty map is to reveal the spatial heterogeneity in standard of living. As such, relative ranking of areas rather than absolute values is more important. The choice of the poverty line has little bearing on the ranking of areas within governorates. Indeed, correlation of within-governorate rank of nahiyas calculated using regional and national poverty lines is 0.87.

**TABLE 1: Poverty lines (ID per person per month)**

| **Regional poverty lines** | |
|---|---|
| Kurdistan | 142410.7 |
| Baghdad | 115934.7 |
| Rest of Iraq | 101675.9 |
| National poverty line | 105500.4 |

7

# Administrative Structure

There are three levels of administration in Iraq: governorates, qhadas, and nahiyas. The governorates of Duhok, Sulaimaniya, and Erbil form the autonomous region of Kurdistan and the governorate of Baghdad consists of the capital city and the outlying areas. The remaining 14 governorates constitute the rest of Iraq. Each governorate is subdivided into qhadas (districts) and nahiyas (sub-districts). The total number of qhadas and nahiyas are 120 and 393 respectively but their numbers per governorate vary widely (Figure 1).

For the purpose of planning and policymaking, it would be ideal to be able to rank all communities, villages, and towns. However, there is a trade-off between the level at which one estimates poverty and the precision of the estimates; the lower the administrative unit, or the smaller the area, the less precise the poverty estimates become. Number of households per village or town in I-PMM is too low for meaningful poverty projections. Therefore, in this exercise, the lowest administrative level at which poverty rates are reported is the nahiya. This is already a stretch because some nahiyas have as few as 50 households.

**FIGURE 1: Administrative structure**

Iraq

| Governorate | Qhada | Nahiya |
|---|---|---|
| Duhok | 7 | 26 |
| Nainawa | 10 | 31 |
| Sulaimaniya | 16 | 61 |
| Kirkuk | 4 | 16 |
| Erbil | 9 | 41 |
| Diyala | 6 | 21 |
| Anbar | 8 | 22 |
| Baghdad | 10 | 32 |
| Babylon | 4 | 16 |
| Kerbela | 3 | 7 |
| Wasit | 6 | 17 |
| Salah Al-Deen | 8 | 17 |
| Najaf | 3 | 10 |
| Qadisiya | 4 | 15 |
| Muthana | 4 | 11 |
| Thi-Qar | 5 | 20 |
| Maysan | 6 | 15 |
| Basrah | 7 | 15 |
| Total | 120 | 393 |

8

# Results

## Governorate level predictions

The accuracy of the models is judged by comparing the governorate level predictions with direct estimates from IHSES 2012/13. This comparison is possible because IHSES 2012/13 is representative at the governorate level. Direct and estimated poverty rates, standard errors, and z-values for the difference in means are presented in Table 2.[2] The projections are consistent with the IHSES poverty rates: the estimates for all 18 governorates fall within the 95 percent confidence interval of the IHSES mean and the largest absolute value of z-score is 1.48, well within the usual threshold of two standard errors.

## Robustness checks

According to the IHSES, national poverty rate in 2012/13 was 18.9 percent, with the lower and upper bounds of the 95 percent confidence interval 17.9 and 19.9 percent respectively (Table 2), while the weighted average of predicted poverty rates is 18.2 percent. Thus the estimate falls well within 2 standard deviation of the IHSES rate and the absolute difference is only 0.7 percent.

With 18 governorates, there are 153 pairs of between-governorate comparisons of statistical significance. In IHSES, 119 pairs of governorates have statistically different poverty rates. The imputation results are remarkably consistent with the IHSES results: of the 119 pairs, 116 are statistically different in the imputation data as well. In addition, 14 new pairs of governorates are statistically different in the simulation, bringing the total to 130. This also shows that the loss in precision due to modeling and sampling errors is more than offset by the gain due to larger sample size.

[2] z-value measures the distance between the two means in standard errors:
$z = (\mu_{IPMM} - \mu_{IHSES}) / \sqrt{(s.e._{IPMM})^2 + (s.e._{IHSES})^2}$

**TABLE 2: Comparison of direct and predicted estimates**

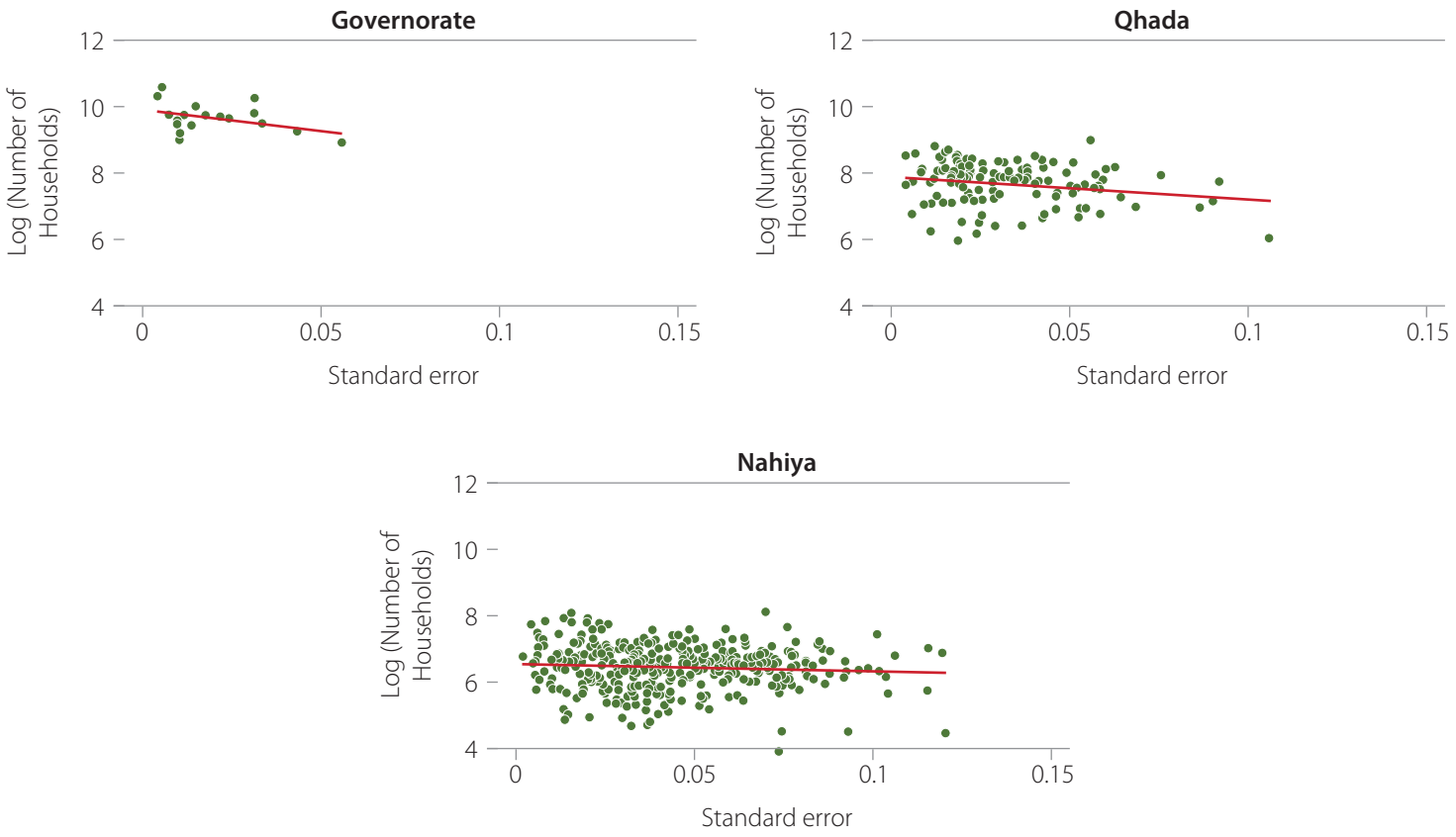
| | Sample size | | Direct estimate (National poverty line) | | | | PovMap estimate | | z-value |
|---|---|---|---|---|---|---|---|---|---|
| | IHSES | I-PMM | FGT(0) | s.e. | 95% CI | | FGT(0) | s.e. | |
| Duhok | 1,348 | 14,475 | 0.058 | 0.008 | 0.043 | 0.073 | 0.059 | 0.010 | –0.364 |
| Nainawa | 1,885 | 27,814 | 0.345 | 0.023 | 0.301 | 0.390 | 0.377 | 0.031 | –0.576 |
| Sulaimaniya | 3,292 | 29,216 | 0.020 | 0.003 | 0.014 | 0.026 | 0.014 | 0.004 | 0.157 |
| Kirkuk | 827 | 12,586 | 0.091 | 0.016 | 0.059 | 0.122 | 0.088 | 0.010 | 0.171 |
| Erbil | 1,933 | 22,275 | 0.036 | 0.007 | 0.022 | 0.049 | 0.041 | 0.015 | 0.870 |
| Diyala | 1,272 | 17,977 | 0.205 | 0.018 | 0.170 | 0.239 | 0.208 | 0.031 | 0.175 |
| Anbar | 1,718 | 16,055 | 0.154 | 0.022 | 0.111 | 0.196 | 0.187 | 0.022 | –1.248 |
| Baghdad | 2,150 | 39,729 | 0.120 | 0.012 | 0.096 | 0.145 | 0.108 | 0.005 | 1.355 |
| Babylon | 863 | 16,812 | 0.145 | 0.016 | 0.114 | 0.177 | 0.122 | 0.011 | 1.377 |
| Kerbela | 612 | 8,212 | 0.124 | 0.029 | 0.067 | 0.180 | 0.134 | 0.010 | 0.214 |
| Wasit | 1,291 | 13,226 | 0.261 | 0.029 | 0.204 | 0.318 | 0.247 | 0.033 | 0.290 |
| Salah al-deen | 1,717 | 15,283 | 0.166 | 0.015 | 0.137 | 0.194 | 0.163 | 0.024 | 0.739 |
| Najaf | 646 | 9,866 | 0.108 | 0.026 | 0.057 | 0.158 | 0.087 | 0.010 | 0.307 |
| Qadisiya | 858 | 12,356 | 0.441 | 0.026 | 0.390 | 0.492 | 0.448 | 0.014 | 0.162 |
| Muthanna | 862 | 7,456 | 0.525 | 0.036 | 0.455 | 0.596 | 0.544 | 0.056 | 0.714 |
| Thi-qar | 1,078 | 16,748 | 0.409 | 0.026 | 0.358 | 0.459 | 0.376 | 0.017 | 1.043 |
| Maysan | 1,288 | 10,376 | 0.423 | 0.033 | 0.357 | 0.488 | 0.365 | 0.043 | 1.137 |
| Basrah | 1,506 | 17,022 | 0.149 | 0.018 | 0.114 | 0.184 | 0.129 | 0.007 | 1.479 |
| **Iraq** | **25,146** | **307,484** | **0.189** | **0.005** | **0.179** | **0.199** | **0.182** | | |

## Analysis of standard errors

As discussed in the methodology section, there is some uncertainty associated with the predictions. This uncertainty is reflected in the standard error of the estimates; the higher the standard error, the lower the precision and the less one can be confident about the predictions. Therefore, the estimates must be read together with their standard errors. A simplistic reading of the predicted poverty rate might lead one to conclude that one area is poorer than the other while the two areas could be statistically indistinguishable.

It is not surprising that standard errors are decreasing with the sample size. On average, standard errors at the governorate, qhada, and nahiya level are 0.020, 0.032, and 0.045 respectively for sample size of approximately 16994, 2549, and 778 households. Standard errors are also decreasing in the number of households within each level of administration; governorates, qhadas, and nahiyas with fewer households have higher standard error in general, illustrated by the negative slope of the line of best fit in Figure 2.The largest governorate-level standard error is 0.056, while the comparable figure for qhadas and nahiyas are 0.106 and 0.120 respectively (Figure 3). Out of 120 qhadas,

**FIGURE 2: Standard error of estimated poverty rate**

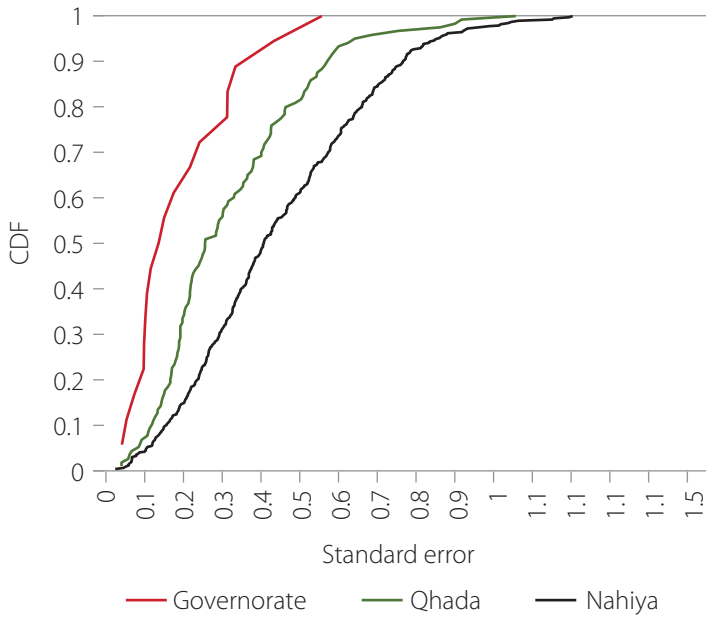


less than a fifth (23) have standard error of more than 0.050 and nine nahiyas out of 393 have standard error of more than 0.10.

An alternative way to interpret standard errors is through confidence interval. Confidence interval is a range of values which is likely to include an unknown population parameter. The interval varies from sample to sample but if from the same population, a certain independent samples are taken repeatedly, a known percentage of the intervals will include the unknown parameter. Almost half the qhadas (58 of 120) and a quarter of the nahiyas (90 of 393) have a confidence interval of 10 percentage points or lower.

Overall, the estimates are remarkable precise considering the relatively small number of households per nahiya and the sampling error in the imputation data. High degree of comparability between IHSES and IPMM data is likely responsible for the precision in the estimates. Details on nahiya level estimates and their standard errors are presented in Appendix A.

**FIGURE 3: CDF of standard errors**



# 9 Maps

## Iraq

The visual representation of spatial distribution of poverty confirms many of the previous analytical findings and intuitive notions of prevalence of poverty in the country. The added value of the map is the revelation of pockets of poverty and islands of prosperity that would not have been apparent otherwise. For instance, there is considerable heterogeneity in headcount rate even within the poorest governorates. Nahiya-level headcount rate in Maysan ranges from 21 to 72 percent, a spread of 51 percentage points. The poverty rate in Thi-Qar is 37.6 percent, more than twice the national rate; nevertheless, Al-Nasiriya Qadha Center has a poverty rate of 23.1 percent, only slightly above the national average. Although the poverty rate in Baghdad is 10.8 percent, estimated poverty rate of al-Mishahda nahiya in Baghdad is 49.5 percent, almost five times the governorate average, and it is statistically different from all other nahiyas in the governorate. Only through the small area estimation exercise do these patterns become apparent.

Headcount rate and number of poor are alternative ways to visualize the spatial pattern of poverty. Areas with high headcount rate are typically areas that have historically been marginalized and left out of the development process. Where equity consideration and national political preference prioritizes the development of such regions, it is justified to allocate disproportionately higher budget to those areas to increase linkage with markets and build infrastructure networks like roads, electricity grid, and irrigation canals. Such areas are usually remote, rural, and sparsely populated. However, if the national priority is to reduce poverty headcount, it is efficient to focus on where most of the poor live. Usually, despite low headcount rate, urban and semi-urban areas are host to more poor people than the poorest parts because of the population size. This has important policy implications as we discuss in the concluding section.

Often there is little overlap between areas with the highest poverty rate and areas with the most number of poor people (Figures 4 and 5 and Tables 3 and 4). Not surprisingly, nahiyas with the highest poverty rate are in the Southern governorates of Maysan, Muthana, and Qadisiya. The nahiya with the highest headcount rate is Gammas in Qadisiya (77 percent) followed closely by

**FIGURE 4: Headcount rate – Iraq**

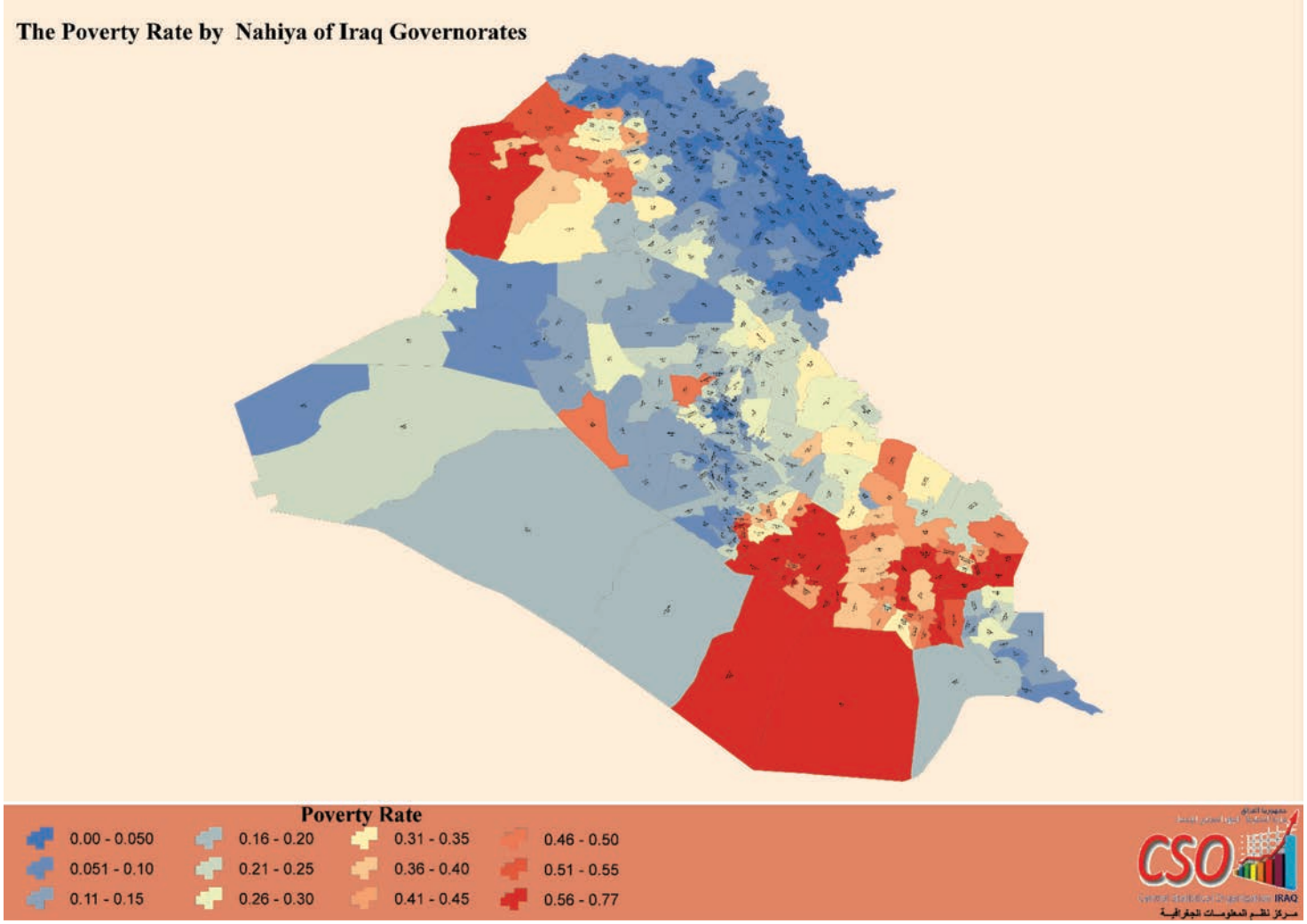


**FIGURE 5: Number of poor – Iraq**

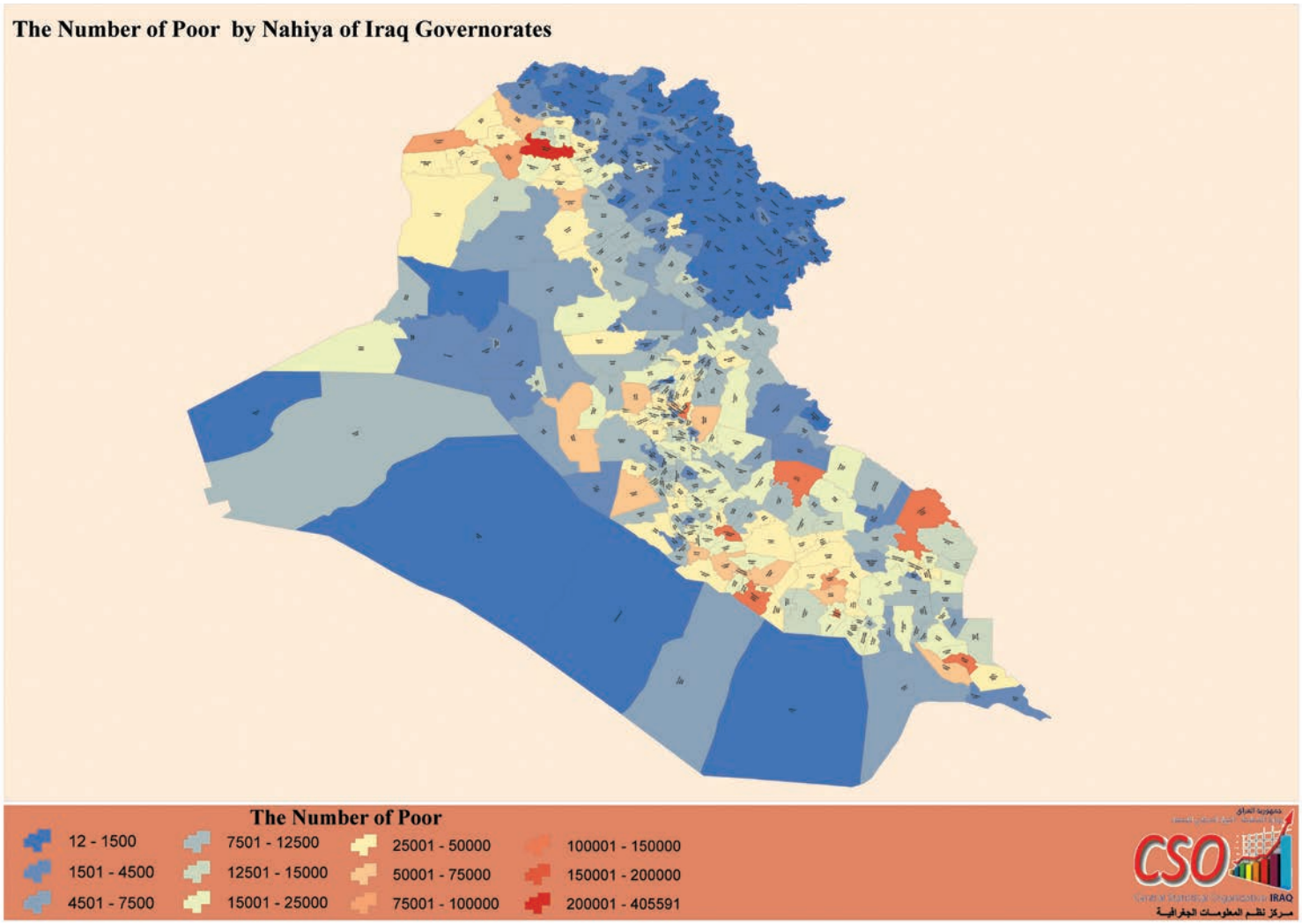


**TABLE 3: Ten nahiyas with the highest poverty headcount rates**

| Governorate | Nahiya | Population | Headcount rate | Std. Err. | [95% Confidence Interval] | | Number of poor |
|---|---|---|---|---|---|---|---|
| Maysan | Said Ahmed Al-Rifaai Nahia | 10450 | 0.67 | 0.08 | 0.50 | 0.82 | 6968 |
| Maysan | Qalat Saleh Qadha Center | 53955 | 0.68 | 0.06 | 0.55 | 0.77 | 36808 |
| Maysan | Al-Ezair Nahia | 29933 | 0.70 | 0.05 | 0.58 | 0.79 | 20875 |
| Muthana | Al-Daraji Nahia | 18258 | 0.70 | 0.09 | 0.51 | 0.86 | 12740 |
| Muthana | Al-Sowair Nahia | 39066 | 0.70 | 0.09 | 0.51 | 0.87 | 27428 |
| Muthana | Al-Warka Nahia | 93216 | 0.71 | 0.09 | 0.52 | 0.88 | 65988 |
| Muthana | Al-Najmi Nahia | 32461 | 0.72 | 0.08 | 0.54 | 0.88 | 23453 |
| Maysan | Bani Hashim Nahia | 20003 | 0.72 | 0.06 | 0.60 | 0.83 | 14498 |
| Muthana | Al-Hilal Nahia | 31800 | 0.73 | 0.08 | 0.55 | 0.88 | 23255 |
| Qadisiya | Gammas Nahia | 87526 | 0.77 | 0.04 | 0.68 | 0.83 | 67351 |

Al-Hilal in Muthana (73 percent) and Bani Hashim in Maysan (72 percent). On the other hand, nahiyas with the highest number of poor are urban centers with many residents. The nahiya with the most number of poor people is Al-Mosal Qadha Center where the city of Mosul is located. Although the predicted headcount rate in Mosul is 31 percent, far lower that some other nahiyas in Nainawa, number of poor is high because it has 1.3 million residents. Nahiyas like Baghdad al-Jedeeda and Al-Basrah Qadha Center are further examples of areas that host a large number of poor despite having a low headcount rate. A comparison of Figures 4 and 5 also make this apparent: nahiyas shaded in deep red in the first map have lighter hues in the second and vice versa.

**TABLE 4: Ten nahiyas with the most number of poor people**

| Governorate | Nahiya | Population | Headcount rate | Std. Err. | [95% Confidence Interval] | | Number of poor |
|---|---|---|---|---|---|---|---|
| Nainawa | Al-Shamal Nahia | 141128 | 0.62 | 0.06 | 0.49 | 0.75 | 87852 |
| Nainawa | Telafar Qadha Center | 193602 | 0.49 | 0.08 | 0.32 | 0.66 | 95078 |
| Qadisiya | Al-Diwaniya Qadha Center | 388415 | 0.27 | 0.04 | 0.20 | 0.35 | 105998 |
| Wasit | Al-Kut Qadha Center | 407511 | 0.26 | 0.06 | 0.15 | 0.38 | 107746 |
| Muthana | Al-Samawa Qadha Center | 271285 | 0.41 | 0.10 | 0.19 | 0.62 | 111254 |
| Basrah | Al-Basrah Qadha Center | 1172742 | 0.10 | 0.02 | 0.06 | 0.13 | 111880 |
| Thi-Qar | Al-Nasiriya Qadha Center | 498661 | 0.23 | 0.04 | 0.14 | 0.32 | 115141 |
| Baghdad | Baghdad Al-Jedeeda Nahia | 1140276 | 0.11 | 0.02 | 0.07 | 0.15 | 126000 |
| Maysan | Al-Amara Qadha Center | 529251 | 0.25 | 0.08 | 0.09 | 0.41 | 131625 |
| Nainawa | Al-Mosal Qadha Center | 1289229 | 0.31 | 0.07 | 0.17 | 0.46 | 405591 |

## Duhouk, Nineveh and Erbil

Duhouk lies in the northwest of Iraq and it is the northern-most governorate, bordering Turkey and Syria and is part of the Kurdistan region. Duhouk was home to many internally displaced persons (IDPs) even before the influx of Syrian refugees in 2014 and the Da'ash related internal displacement.

Overall, poverty rates in Duhouk are low at roughly 6 percent. Estimated poverty headcount rates at the nahiya level range from 3 percent in Zawait, Al-Amadia qadha center, and Sarsank

**FIGURE 6: Headcount rate – Duhouk, Nineveh and Erbil**

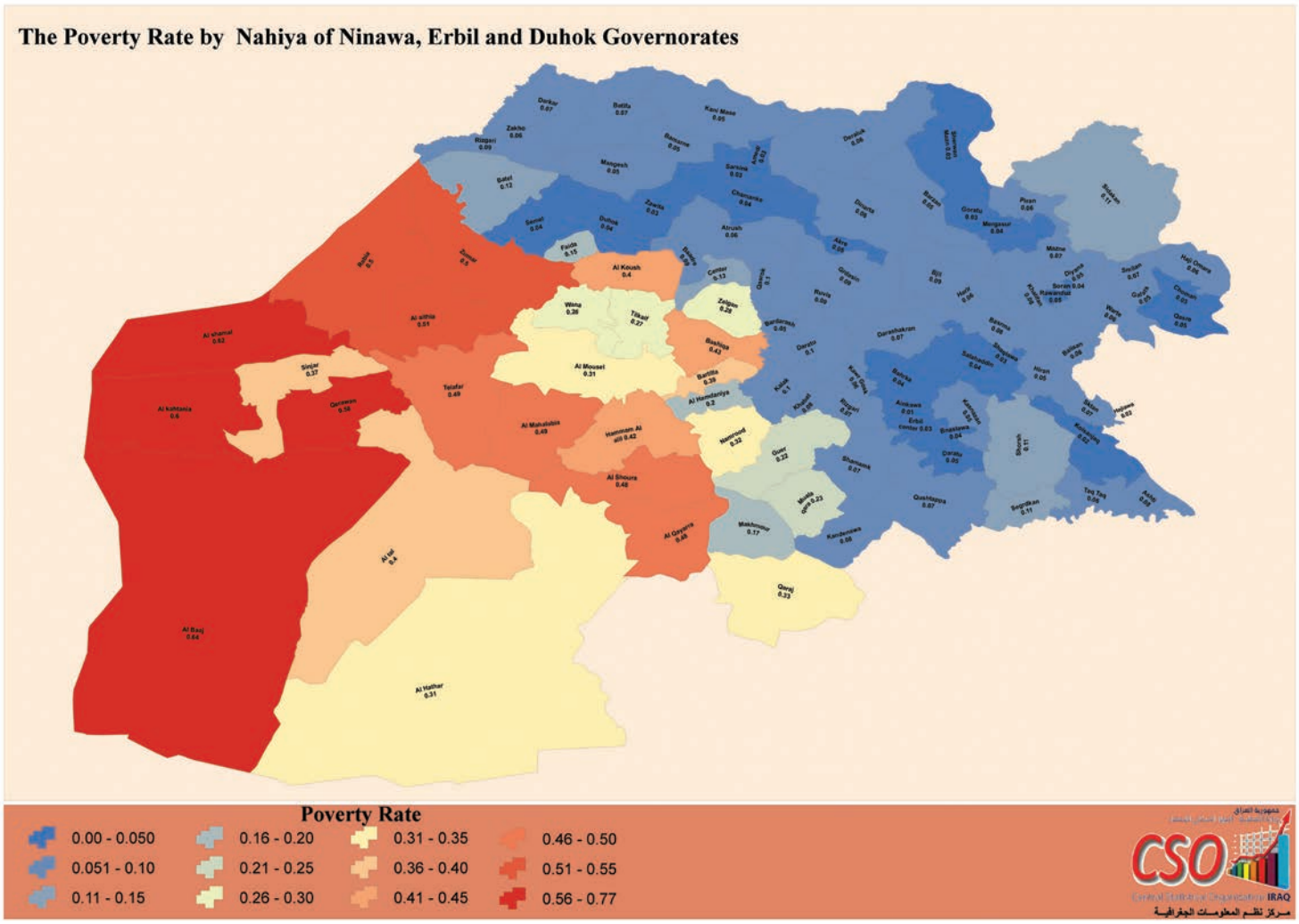
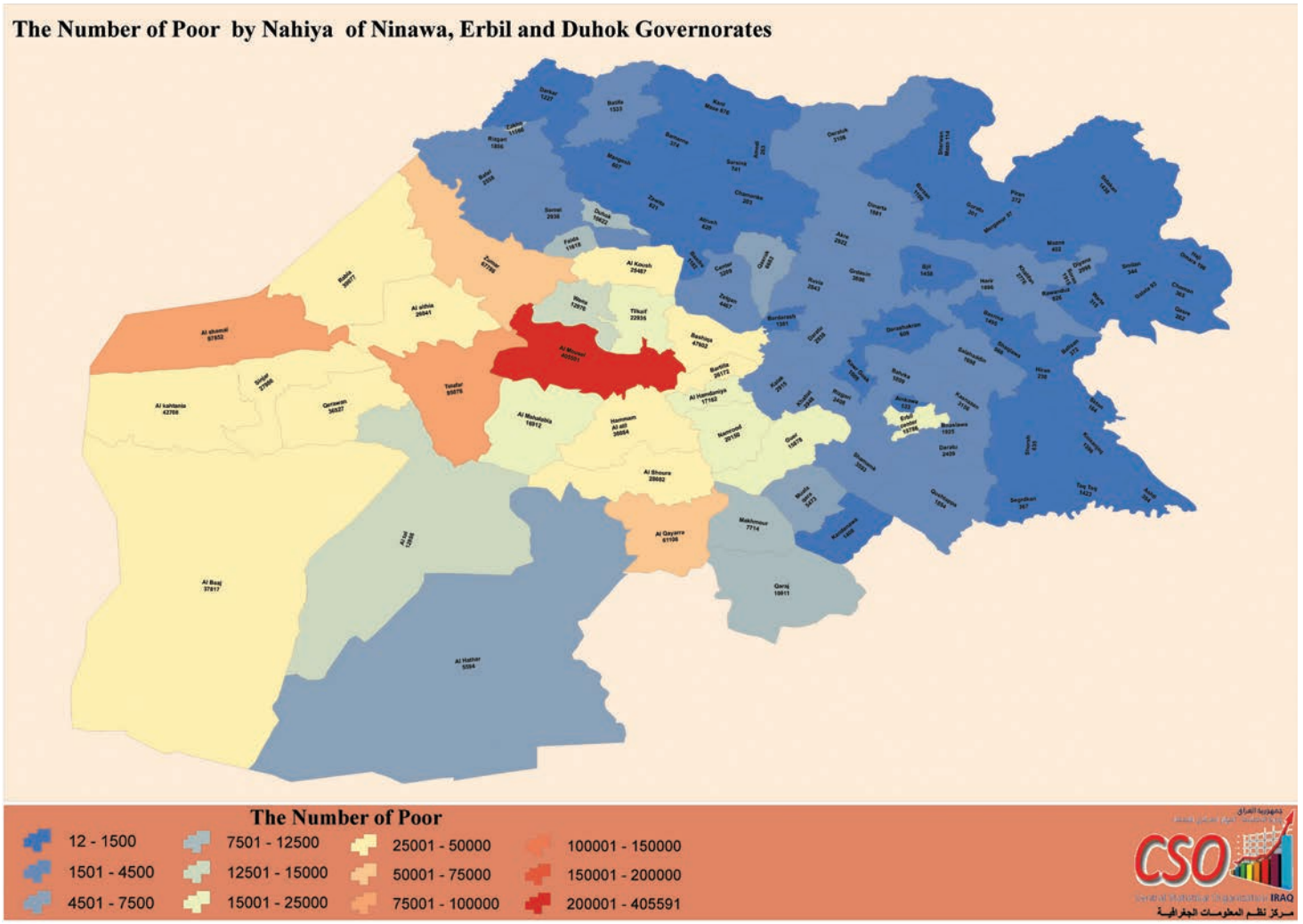


**FIGURE 7: Number of poor – Duhouk, Nineveh and Erbil**




nahiya to 10 percent or more in Bateel, Qasrouk, Kalak and Darto nahiyas. However, the largest number of poor persons are in two nahiyas—Duhouk qadha center (10,600) and Zakhow qadha center (11,600)[3]. These nahiyas are the largest in terms of population in Duhouk; while the former is the governorate capital, the latter is a major transit and check point with Turkey.

Nineveh or Mosul governorate in northern Iraq shares its western border with Syria. Its capital, Mosul, is one of the largest cities in the country. The governorate continued to experience

[3] The number of poor is rounded to the nearest hundred in the text.

violence between 2007 and 2012, and is one of the five poorest governorates in the country. Nahiya level estimates of poverty reveal a striking variation in headcount rates—from less than 15 percent in Kandinawa, Faidah and Al-Shaikhan qadha center, to 50 percent or more in Zummar, Rabia, Al-Ayadiya, Al-Qairawan, Al-Qahtanya, Al-Baaj, and Al-Shamal nahiyas. All the nahiyas with headcount rate of 50 percent or more either border Syria or lie close to the Syrian border. Many of these are also very populous nahiyas, together accounting for 27 percent of Nineveh's poor, and many of them are home to more than 35,000 poor persons each. However, the largest number of poor people are in Mosul qadha center (406,000 persons), the capital of the governorate, which has a population of 1.28 million. Nineveh has the most disproportionate share of poor in the country—while 10 percent of the Iraqi population resides in the governorate, about 20 percent of the poor lives there.

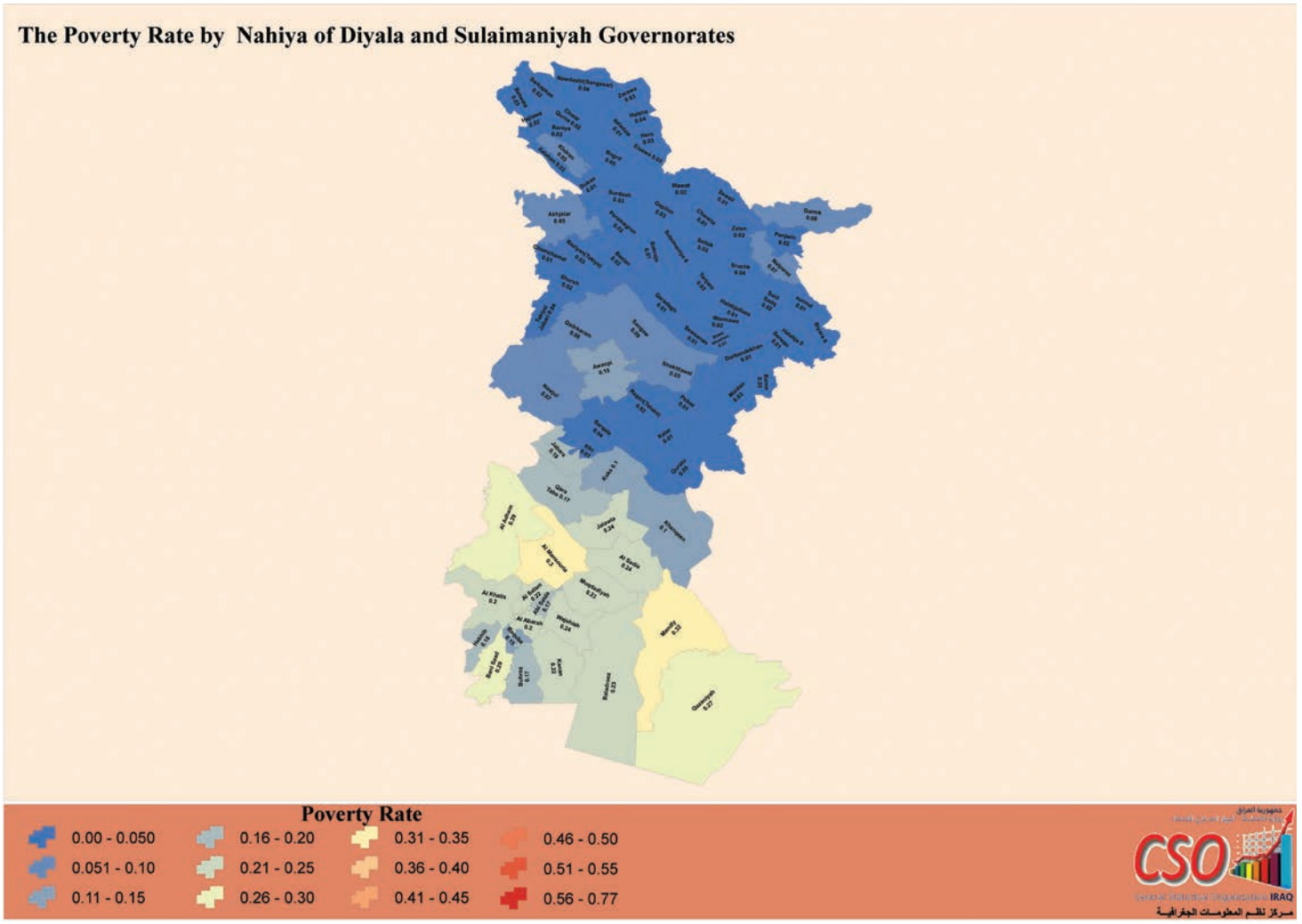
Erbil or Hawler governorate is part of the Kurdistan region of Iraq, and has overall poverty rates of 4.1 percent. At the nahiya level, estimated poverty is almost negligible in Ainkawa, Kuwaisinjaq qadha center, Shaqlawa qadha center, andArbil qadha center at 3 percent or less. The highest poverty rate is in Siakan nahiya, where 11 percent of the population lives below the poverty line. But by far the highest number of poor are in Arbil qadha center, almost 20,000 poor persons, as compared to roughly 1,400 in Siakan, the nahiya with the highest headcount rate.

## Sulaimaniya and Diyala

Sulaimaniya is a northern governorate of Iraq, part of the Kurdistan region, and has the lowest poverty rates in the entire country. In more than two-fifth of its nahiyas, estimated poverty rates are 2 percent or lower; and all but two nahiyas have headcount rate of less than ten percent. The nahiya with the highest number of poor persons is Sulaimaniya qadha center; with an estimated poverty rate of 0.5 percent and a population of approximately 600,000 it has around 3,000 poor persons.

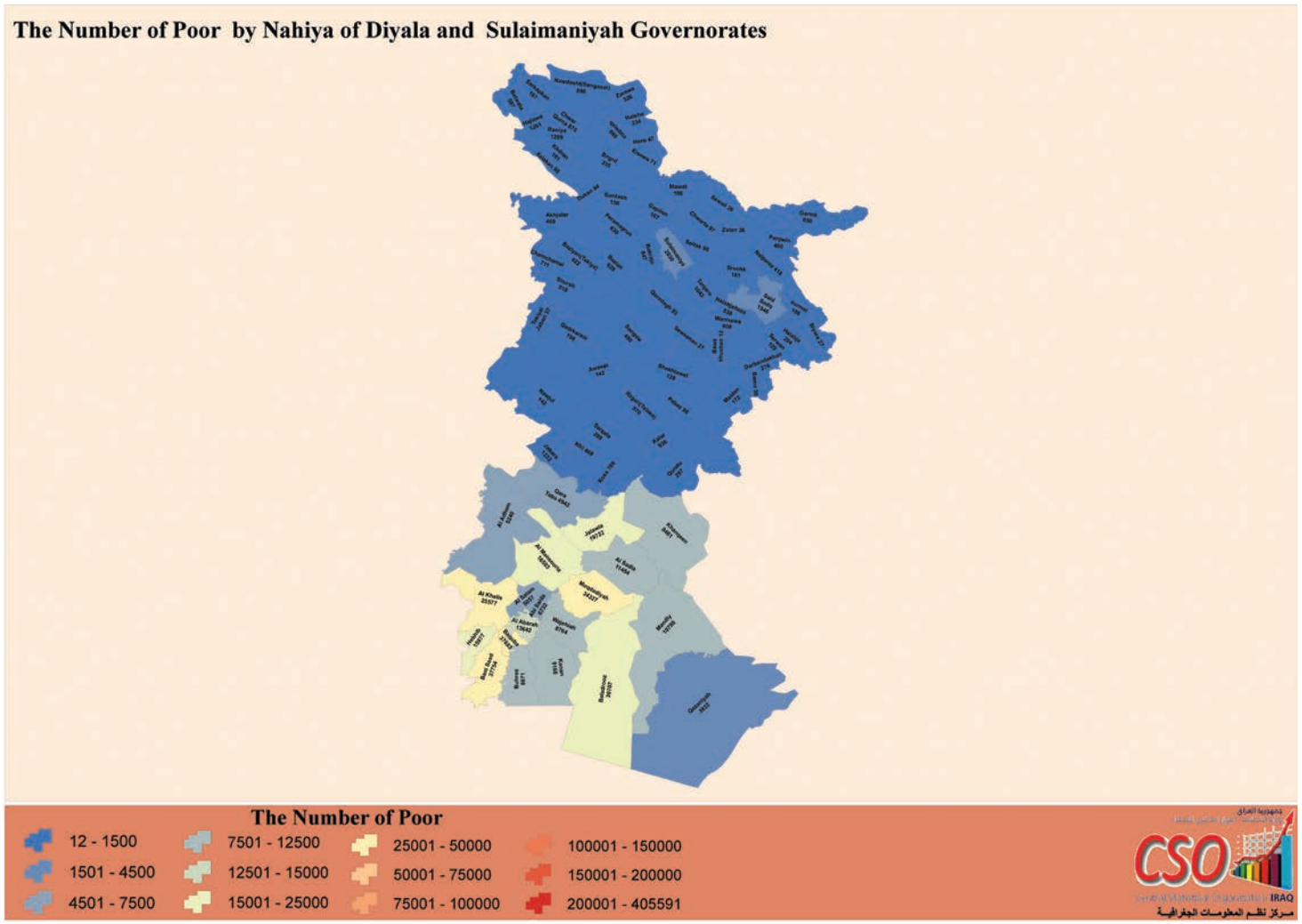
Diyala province lies south of Sulaimaniya and north east of Baghdad, and also borders Iran to its east. Along with Anbar and Nineveh, it continued to experience violence between

**FIGURE 8: Headcount rate – Diyala and Sulaimaniyah**



2007 and 2012. The nahiya with the least poverty rate in Diyala is Khanaqin qadha cente which has a headcount rate of approximately 10 percent. Baquba nahiya, where the governorate capital is located, has the second lowest headcount rate in Diyala—15 percent—but accounts for 38,000 poor persons because of its population of 260,000. Five nahiyas have headcount rates above 25 percent, with the highest rate of 32 percent in Mendili nahiya. Besides Baquba, four other populous nahiyas account for a large number of poor persons in Diyala—Al-Muqdadiya (34,000), Baladrooz (21,000), Al-Khalis qadha center (26,000), and Beni Saad (38,000).

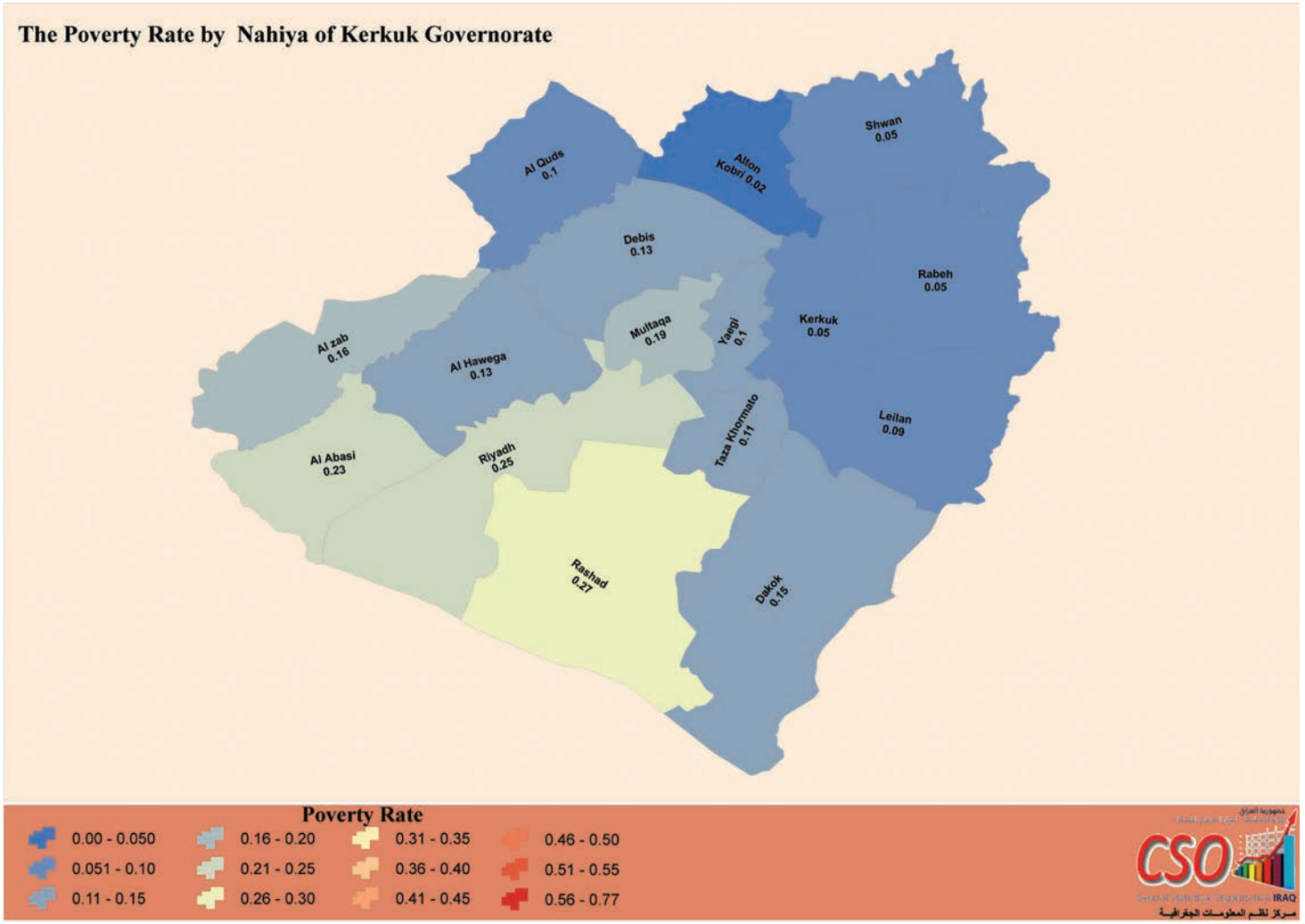
**FIGURE 9: Number of poor – Diyala and Sulaimaniyah**



## Kirkuk

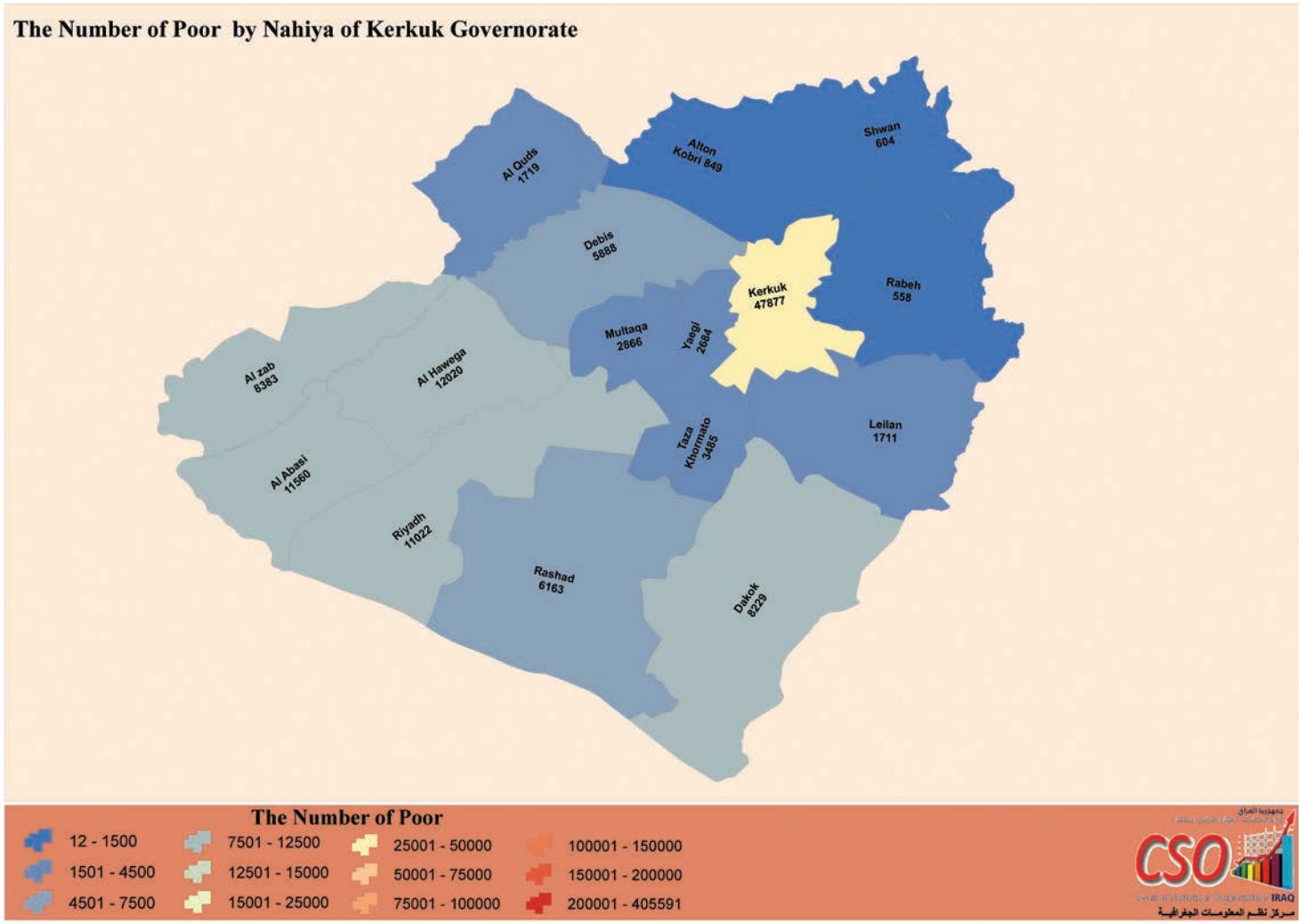
Kirkuk governorate is located east of Nineveh and south west of the Kurdistan region. More than a third of the nahiyas in Kirkuk have poverty rates less than 10 percent including the capital Kirkuk qadha center. About a quarter of the nahiyas have estimated headcount rate higher than 20 percent, all of whom are on the border with Salahadin. Headcount rates increase gradually from single digits to teen and twenties as one moves from north east to south west away from the Kurdistan

**FIGURE 10: Headcount rate – Kirkuk**



border. Despite very low headcount rates of 5 percent, the nahiya with the largest number of poor people is Kirkuk qadha center which is home to almost 900,000 people and almost 48,000 poor persons. In contrast, the nahiya with the highest headcount rate—Al-rashad—has only slightly more than 6,000 poor people because it has only 23,000 residents.

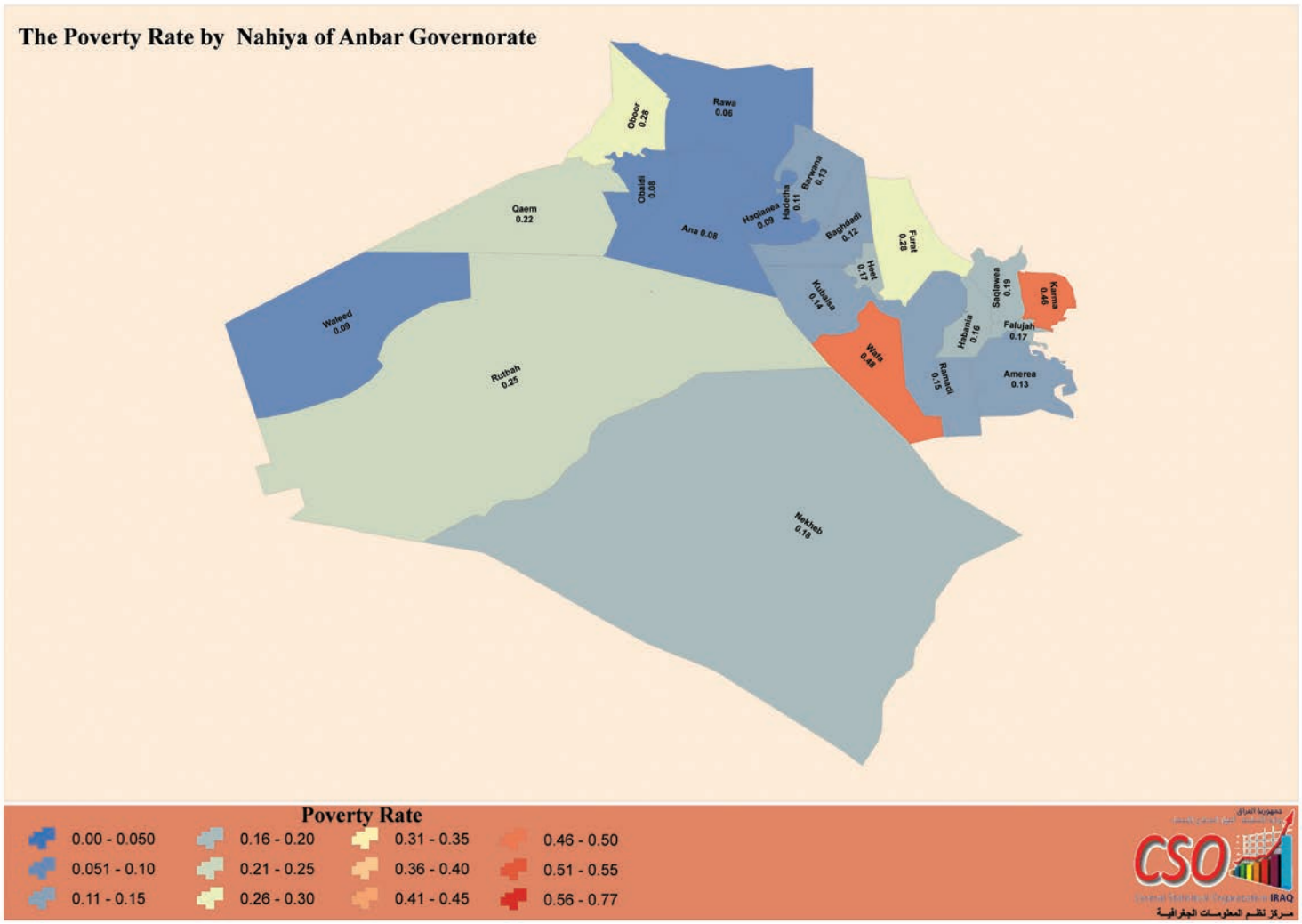
**FIGURE 11: Number of poor – Kirkuk**



## Anbar

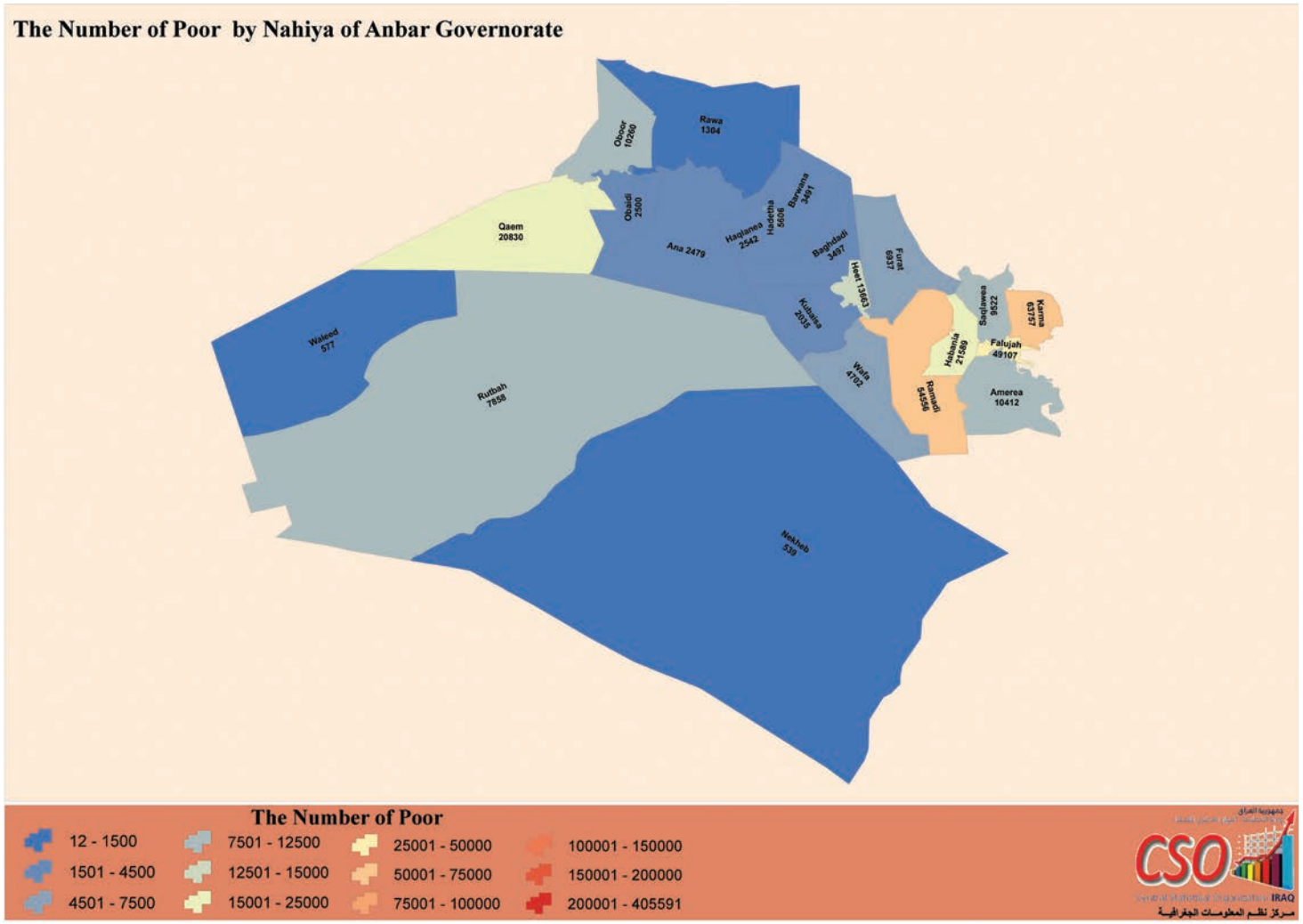
Anbar is Iraq's largest province in terms of geographic area and shares borders with Syria, Jordan and Saudi Arabia. However, it is also the most sparsely populated. Poverty estimates vary widely across the governorate. Al-Garma and Al-Waffa nahiyas, for instance, which border Baghdad and Kerbala respectively, have poverty rates as high as 46 and 48 percent while Rawa qadha center has a poverty rate as low as 6 percent. Moreover, poverty rates are not negligible in the 4 largest nahiyas—Al Ramadi (15 percent), Al Habbaniya (16 percent), Al Falluja (17 percent) and Al-Garma (48 percent)—implying that these four

**FIGURE 12: Headcount rate – Anbar**



alone account for 63 percent of Anbar's poor, with Al-Garma, Al-Fallujah, and Al-Ramadi each accounting for at least 16 percent of all the poor in Anbar.

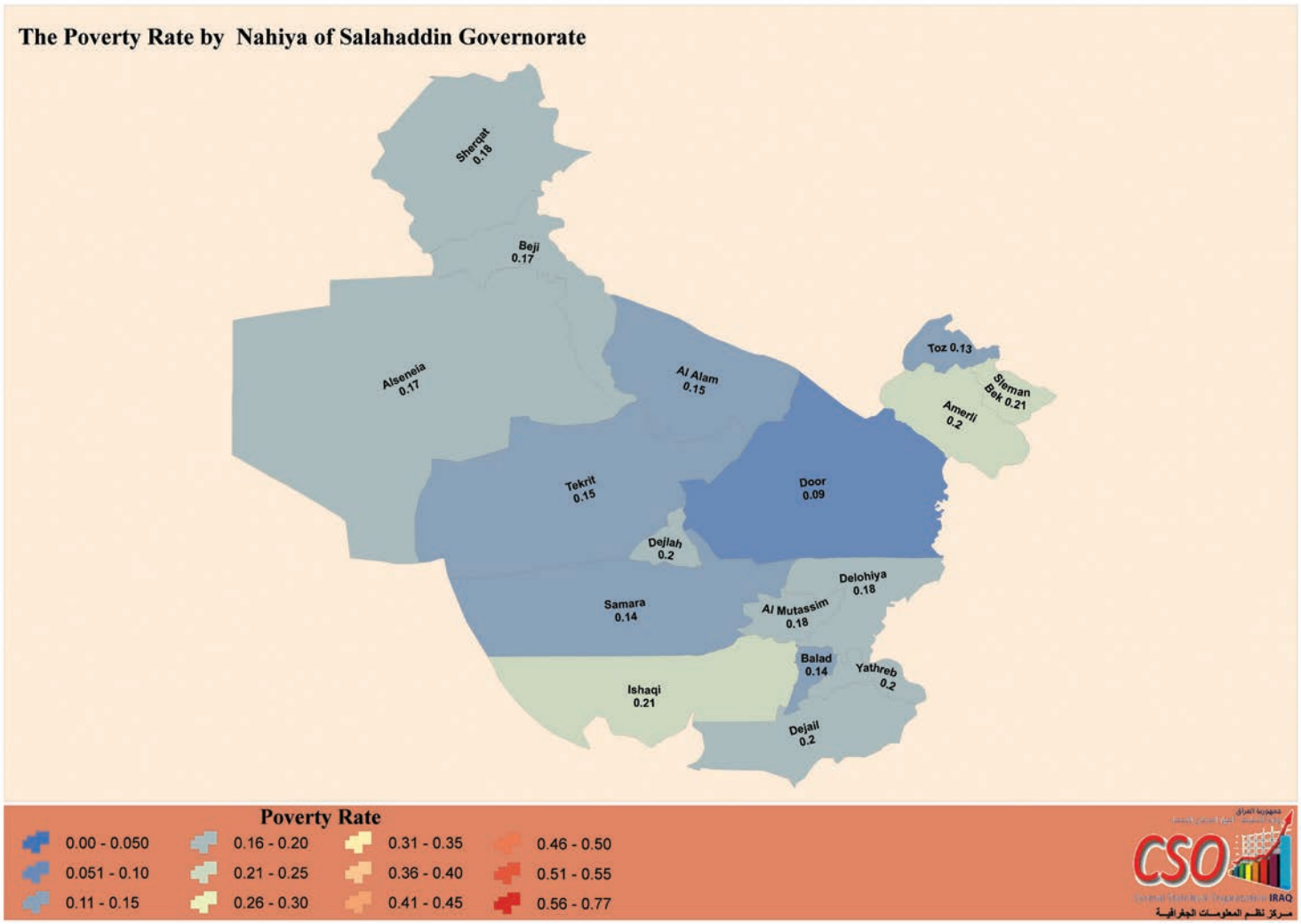
**FIGURE 13: Number of poor – Anbar**



## Salahaddin

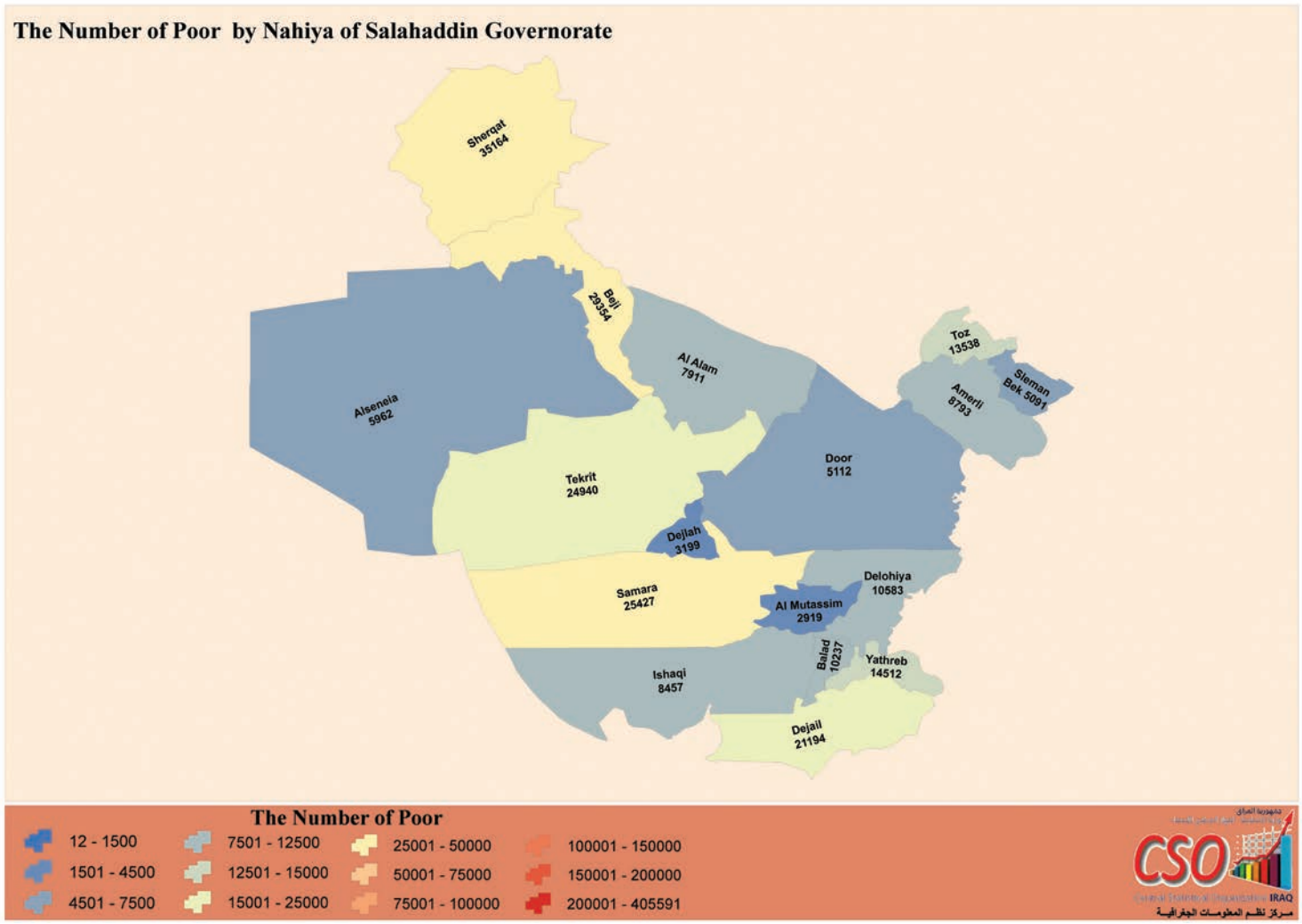
Salahadin governorate lies north of Baghdad, bordered by Anbar on the west and Diyala on the east. Estimates poverty rate in Salahaddin is 16.3 percent, but outside of Kurdistan, it is one of the governorates with the lowest variance in headcount rate across nahiyas. The nahiya with the highest headcount rate—Sulaiman Baig nahiya—has a headcount rate of 21 percent while Al-Daur qadha center, the nahiya with the lowest headcount rate, has 9 percent. The two most populous nahiyas

**FIGURE 14: Headcount rate – Salahaddin**



are Samarra (182,000) and al-Shirqat (200,000) with poverty rates of 14 and 18 percent and 25,000 and 35,000 poor persons respectively. Together, the two nahiyas account for more than a quarter of all the poor in Salahaddin.

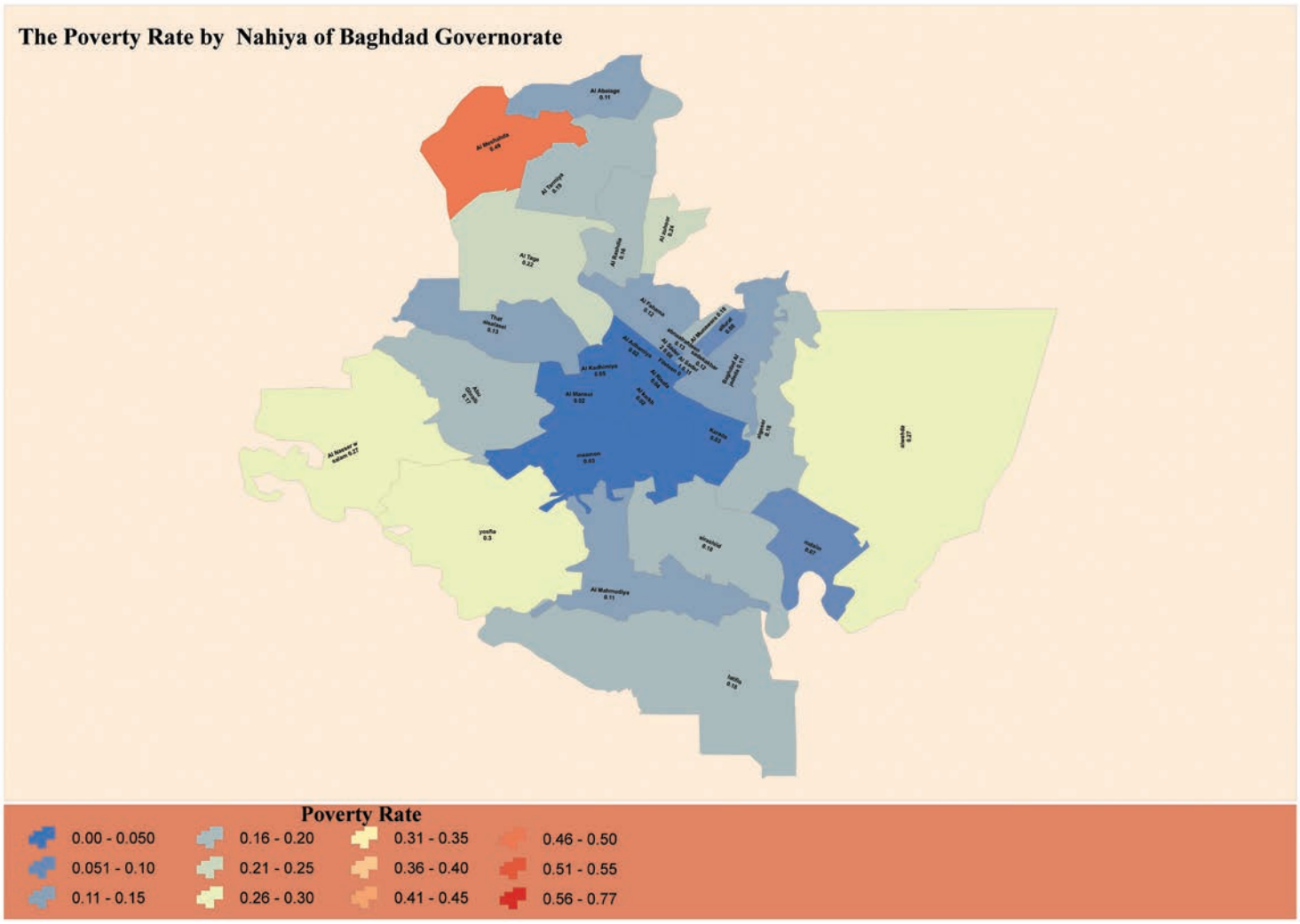
**FIGURE 15: Number of poor – Salahaddin**



## Baghdad

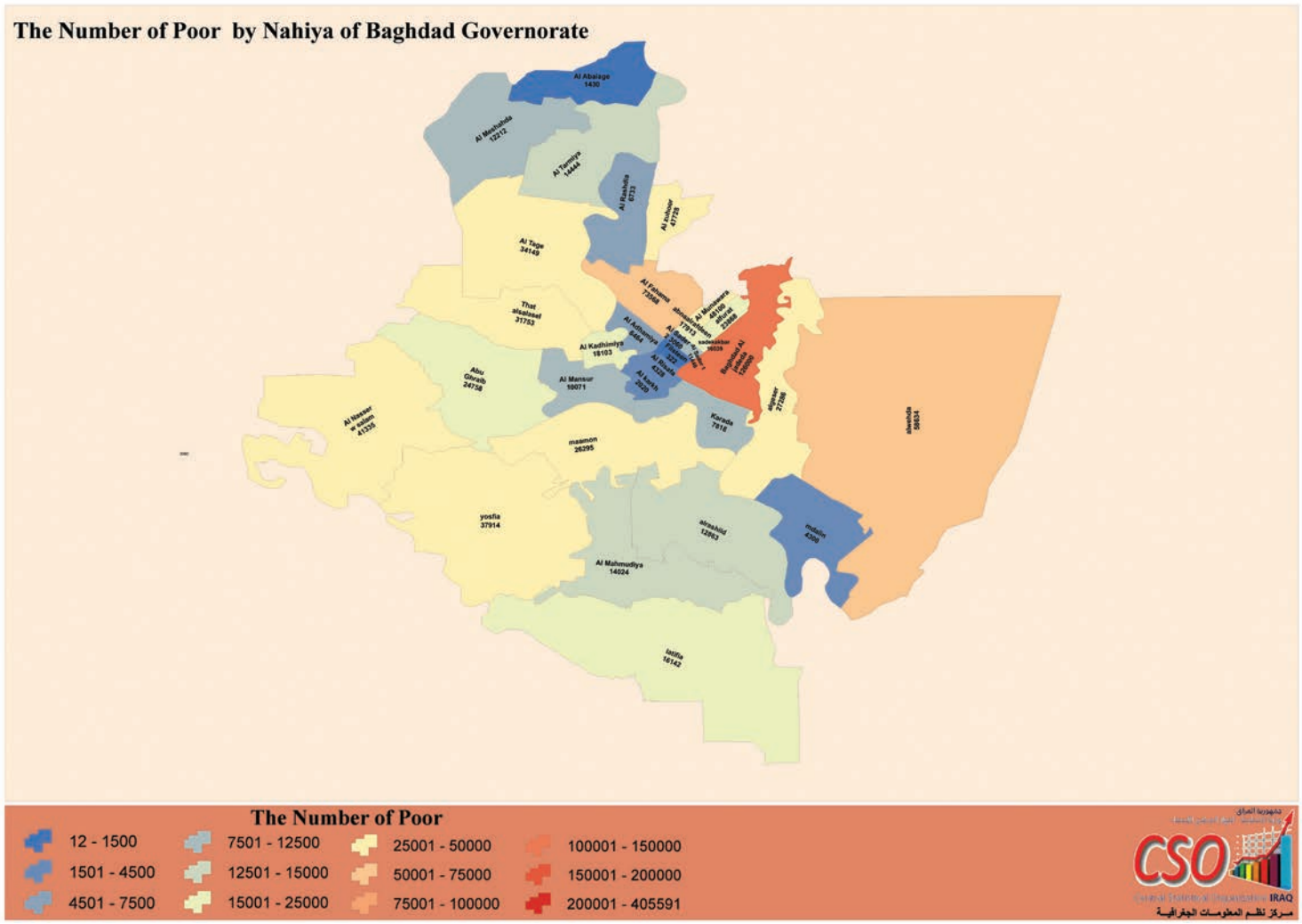
Baghdad is Iraq's smallest governorate in terms of geographical area but it is also one of its most populous. The governorate alone accounts for one-fifth of Iraq's population and 12 percent of Iraq's poor. Its 32 nahiyas show stark differences in welfare levels. The five least poor nahiyas—Palestine, Al-Adhamia, Al-Karkh, al Mansour, and al-Karrda al-Sharqia—have estimated rates of poverty of less than 3 percent. The poorest nahiyas—al-Mishdada (near Fallujah)—on the other hand,

**FIGURE 16: Headcount rate – Baghdad**



has a very high poverty rate of 49 percent. The largest nahiya in terms of population, Baghdad al-Jadeeda, with 1.14 million people, and an estimated poverty rate of 11 percent, alone accounts for almost 126,000 poor persons, the highest in Baghdad, or 15 percent of the poor in the governorate.

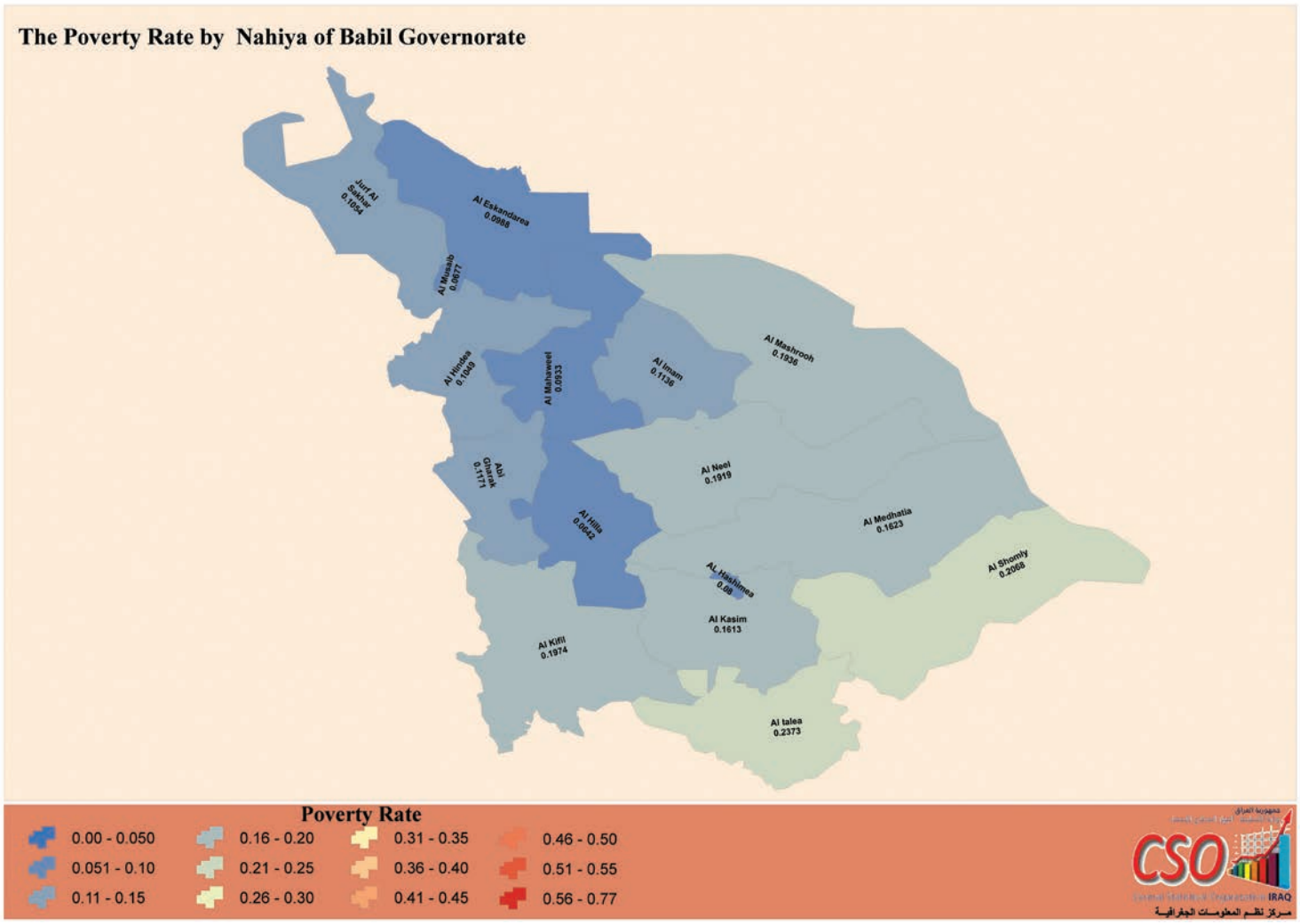
**FIGURE 17: Number of poor – Baghdad**



## Babylon

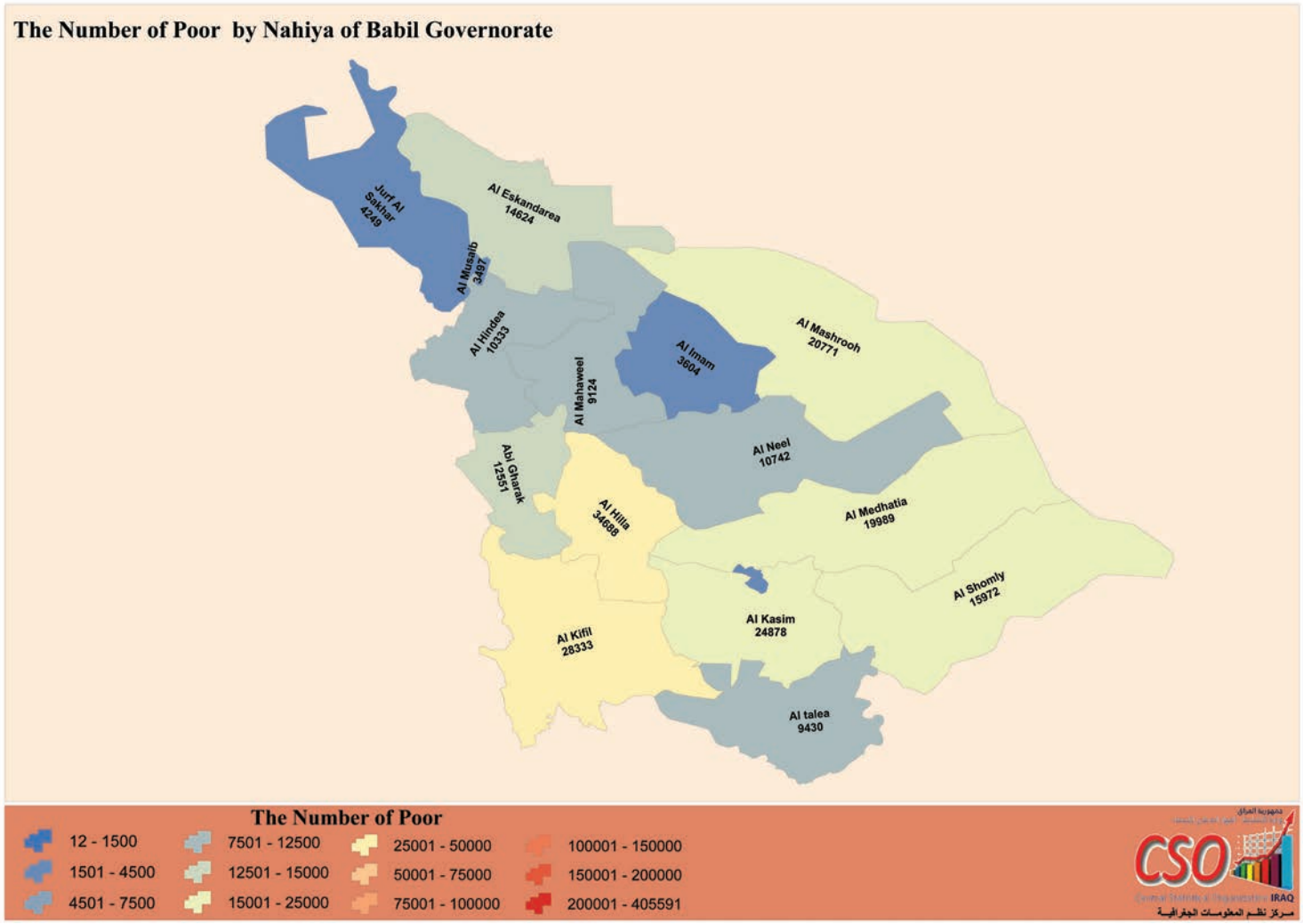
Babylon province in central Iraq is located just south of Baghdad. Overall, poverty rates in the governorate are low (12.2 percent); eleven of sixteen nahiyas have poverty rate below the national average. Al-Hilla qadha center, the capital of the governorate with a population of 540,000, has the lowest estimated poverty rate in the governorate of 6 percent, but accounts for the largest number of poor people—around 35,000 persons. At the other end, al-Talea'a nahiya, bordering Qadisiya

**FIGURE 18: Headcount rate – Babylon**



governorate, has a relatively high poverty rate with almost a quarter of its population, or more than 9,000 people, living below the poverty line. Three nahiyas with the most number of poor—Al-Qasim, Al-Kifl, and Al-Hilla—together account for more than two-fifths of the poor in the governorate. Because of the low poverty incidence, Babylon accounts for 4.5 percent of the poor in Iraq although it is home to 6.9 percent of the population.

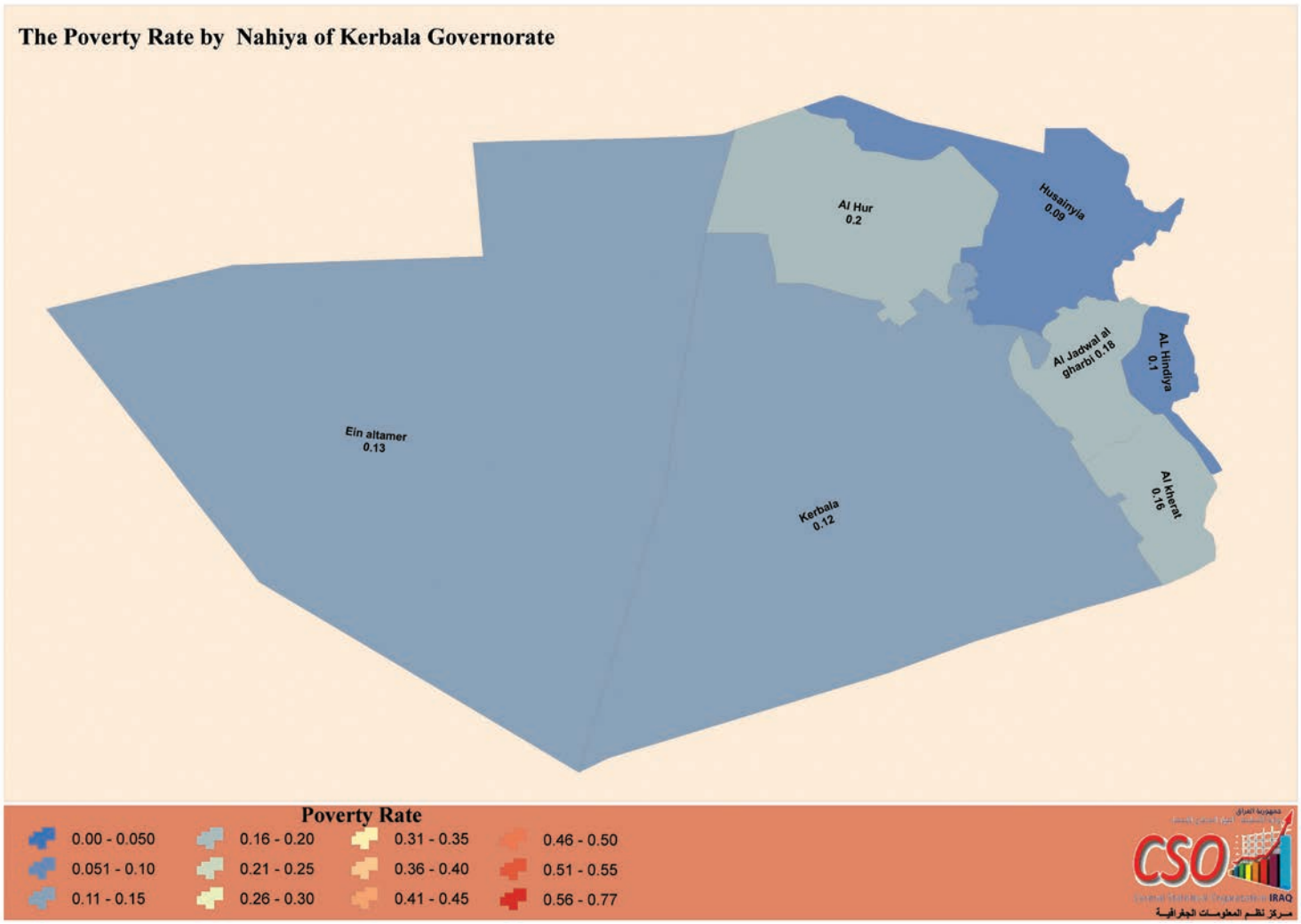
**FIGURE 19: Number of poor – Babylon**



## Kerbala

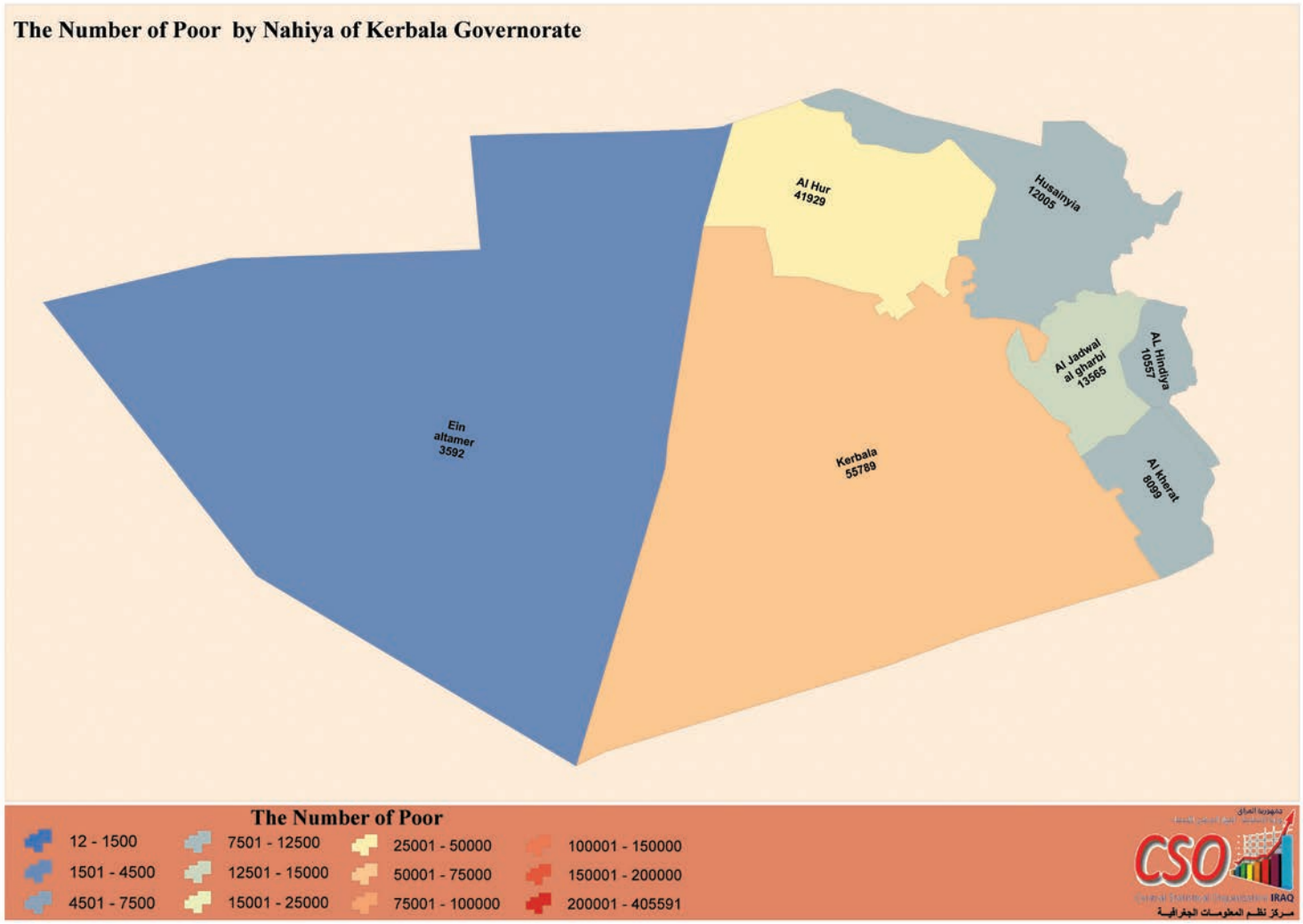
Kerbala governorate, located east of Anbar, and west of Najaf, lies in central Iraq. It is one of Iraq's smallest and least populated provinces (after Missan and Muthanna in the south). Between 2007 and 2012, it witnessed a significant decline in poverty rates, and overall poverty rate is now below the national average. Unlike many of the other governorates, there is relatively low variation in estimated poverty rates across nahiyas in the governorate, ranging from 9 percent in al-Hassaniya nahiya to

**FIGURE 20: Headcount rate – Kerbela**



20 percent in al-Hur nahiya. The most populous nahiya, Kerbala qadha center (480,000), accounts for the largest number of poor persons, around 56,000 people which is about 38 percent of the poor in Kerbala. The share of poor persons in Kerbela is on par with its population: 3.2 percent of Iraqis and 2.3 percent of the poor reside in the governorate.

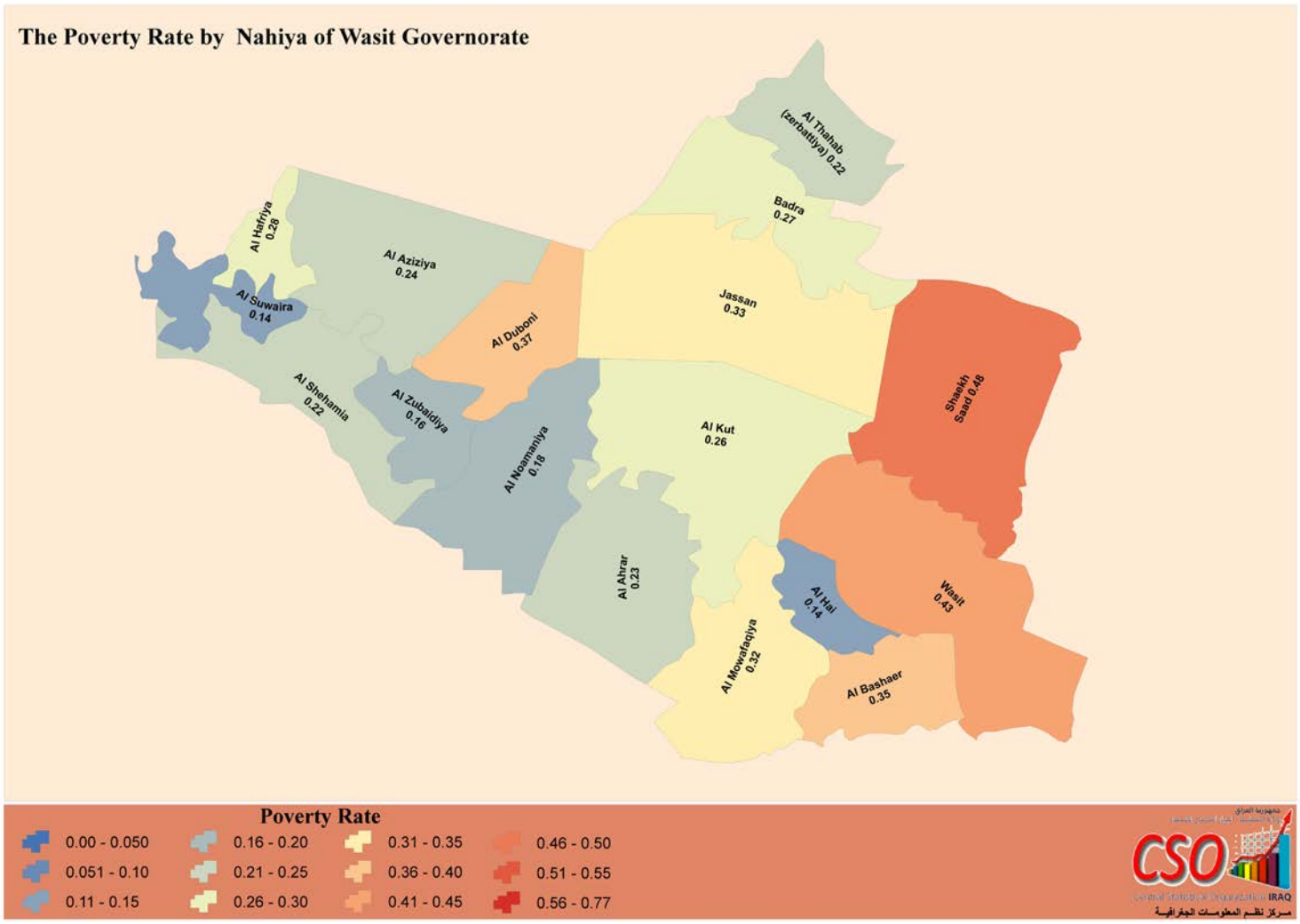
**FIGURE 21: Number of poor – Kerbala**



## Wasit

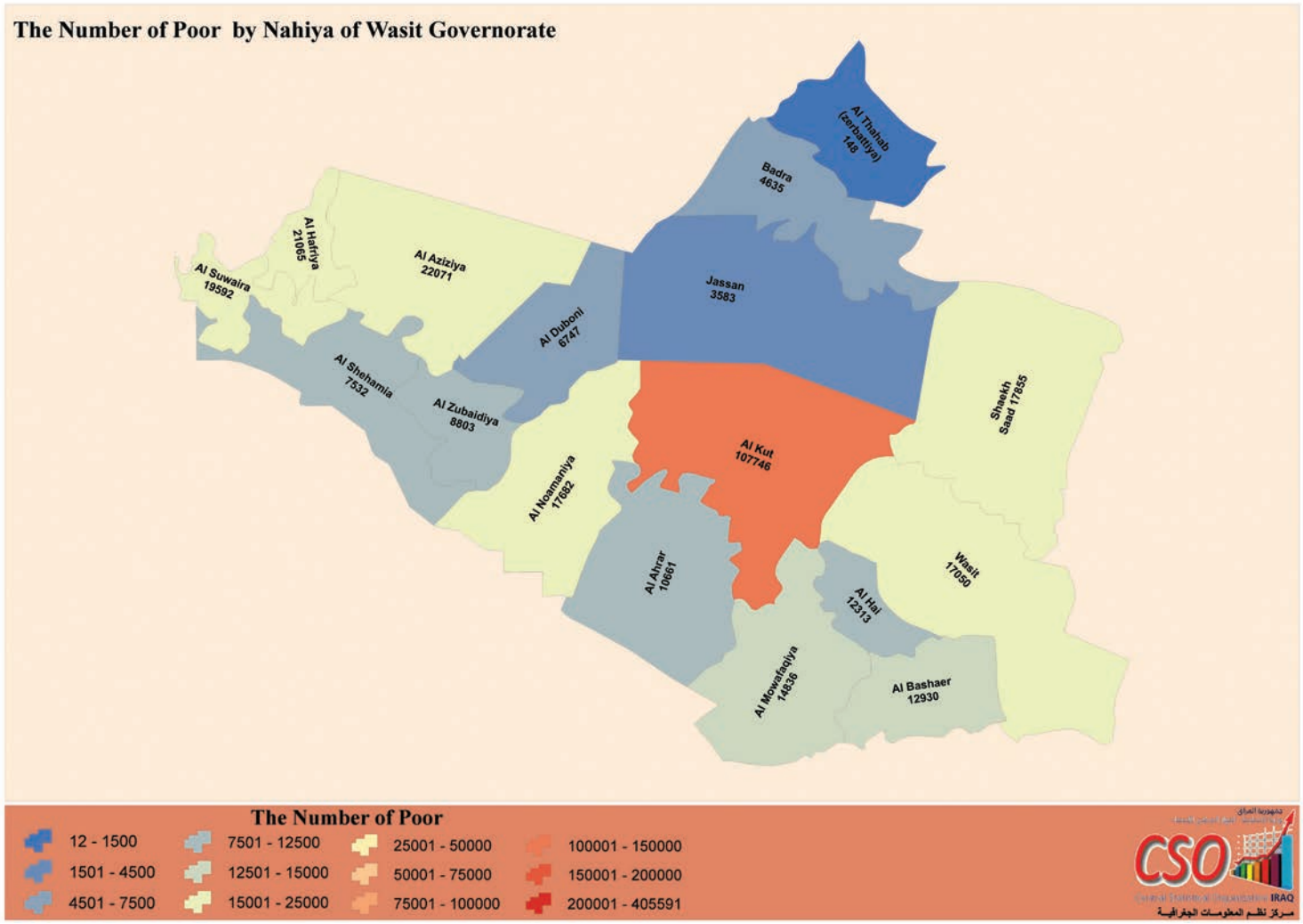
Wasit governorate shares its western border with Babylon province, and its eastern border with Iran. Thirteen of seventeen nahiyas in the governorate experience poverty rates above the national average. Even the capital, al Kut qadha center, has a quarter of its population below the poverty line, or 108,000 poor persons. The highest rates of poverty are in the eastern nahiyas bordering Iraq—Wasit (43 percent) and Sheikh Saad (48 percent)—where almost half the population is poor, but

**FIGURE 22: Headcount rate – Wasit**



because of their small population sizes, they account for only 35,000 poor persons. Overall, Wasit has 3.6 percent of the total Iraqi population and 4.8 percent of the poor.

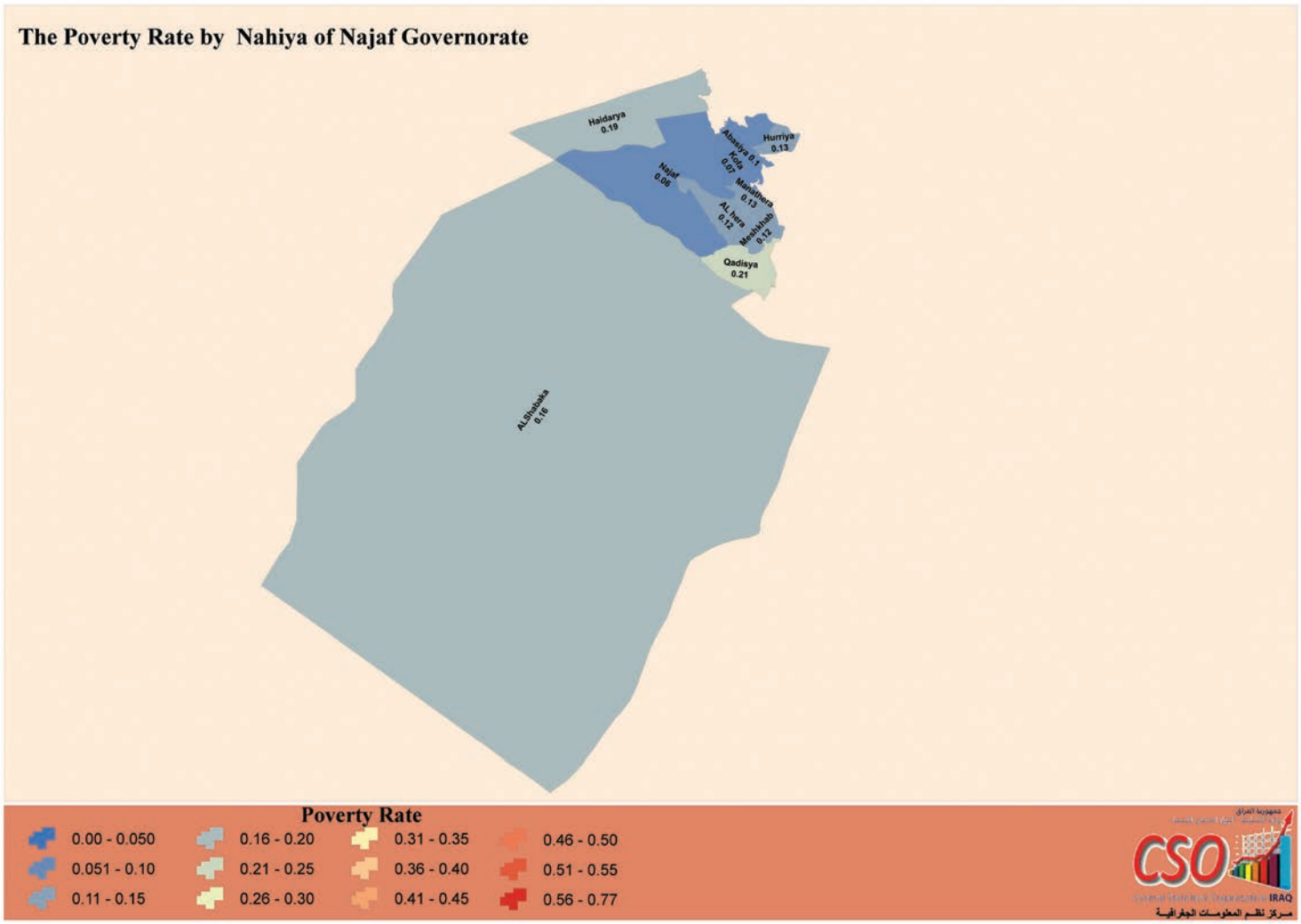
**FIGURE 23: Number of poor – Wasit**



## Najaf

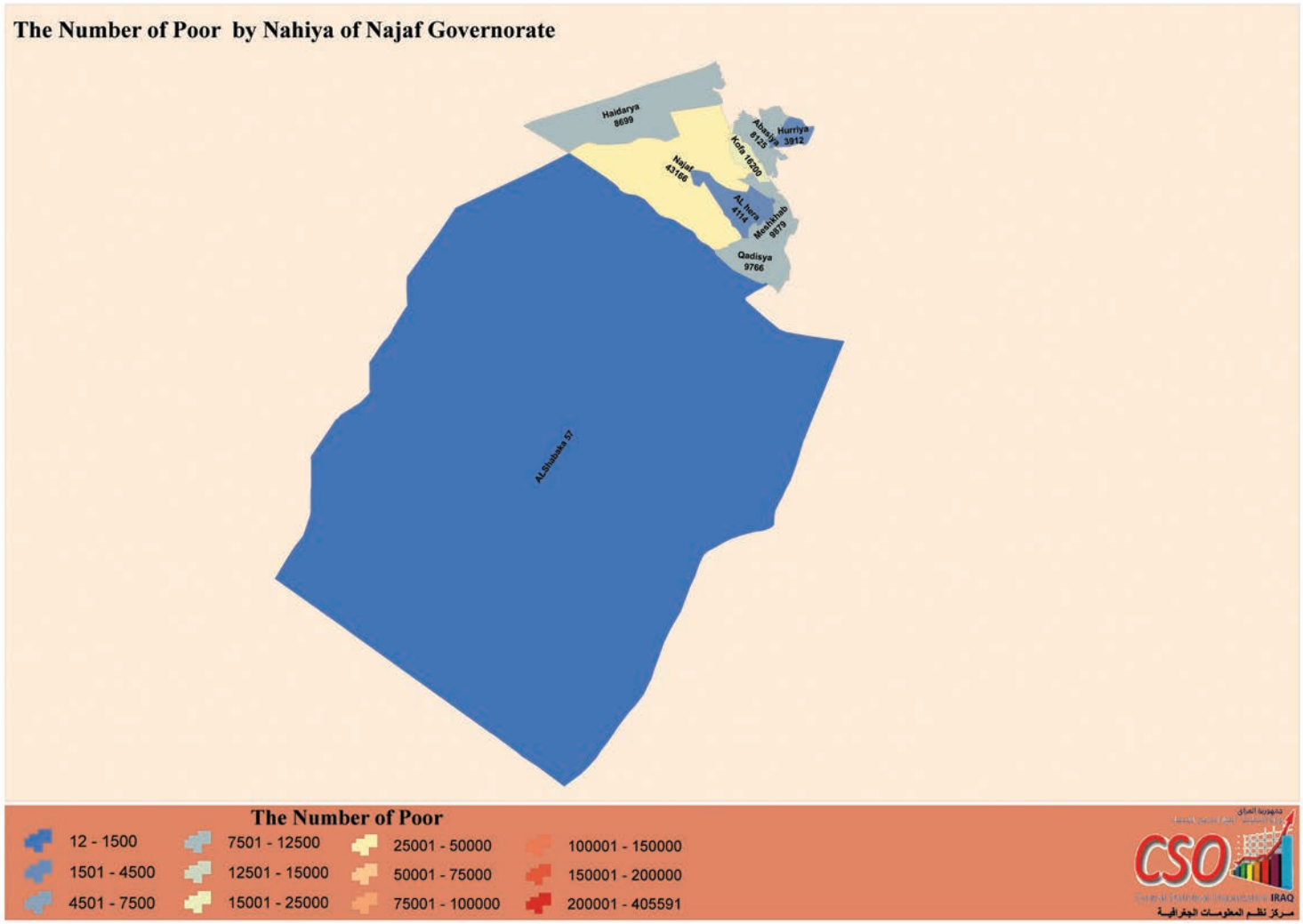
Najaf governorate, south of Kerbala, also experienced rapid declines in poverty between the 2007 and 2012 period, and now has one of the lowest poverty rates in the country. Within the governorate, there is little variation in estimated poverty rates, with the lowest rates of 6 percent in Najaf qadha center, and the highest of 21 percent in al-Qadisiya, with seven out of ten nahiyas having poverty rate less than 15 percent. Because of its high population share, Najaf qadha center, the capital, alone

**FIGURE 24: Headcount rate – Najaf**



accounts for 38 percent of the governorate's poor. Al-Shabaka nahiya is one of the least populous in the country, with much of nahiya being part of the Syrian desert, and an estimated population of only 356 persons of which 57 are estimated to be poor (16 percent). Najaf is home to 3.9 percent of the population and 1.8 percent of the poor.

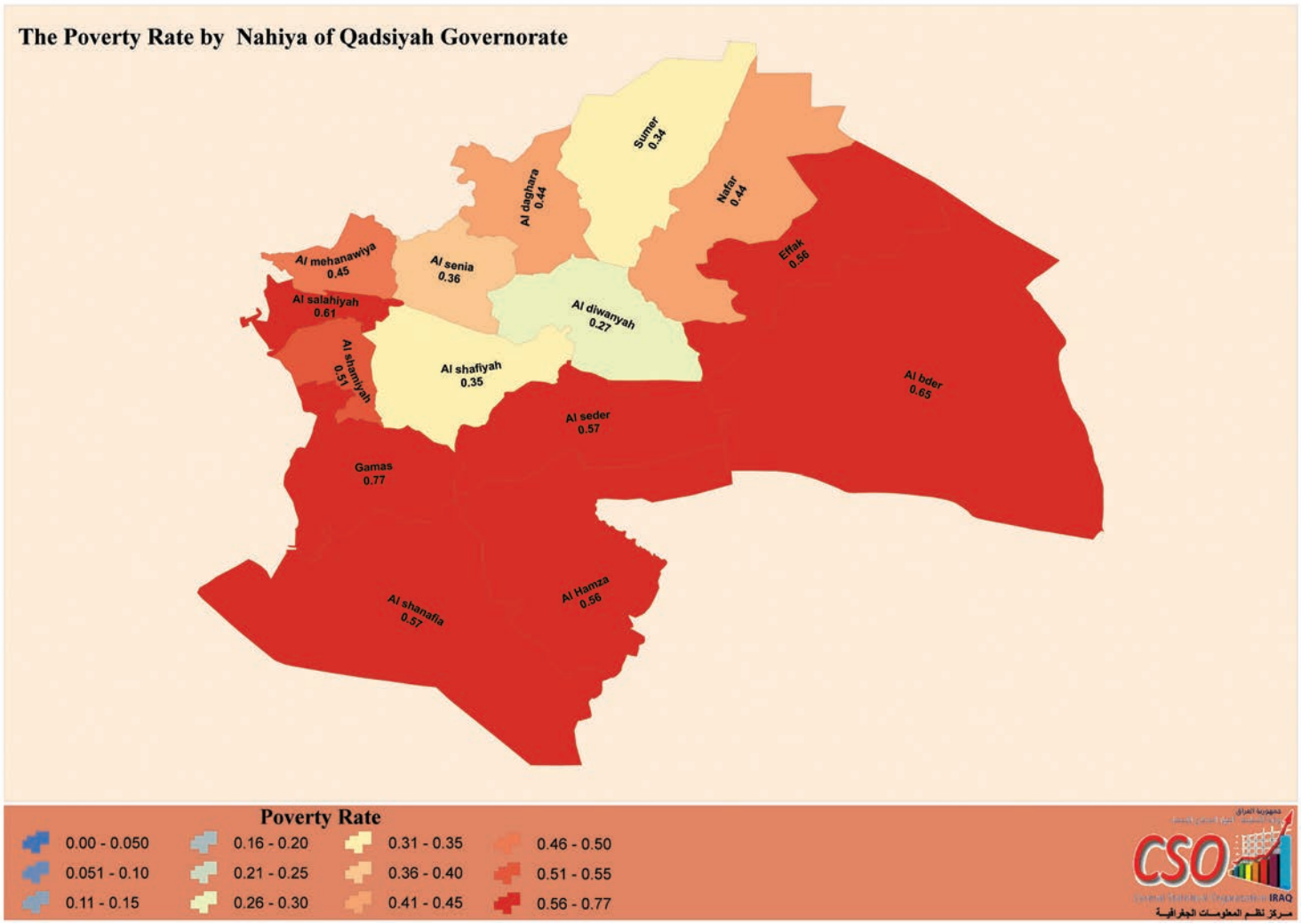
**FIGURE 25: Number of poor – Najaf**



## Qadisiyah

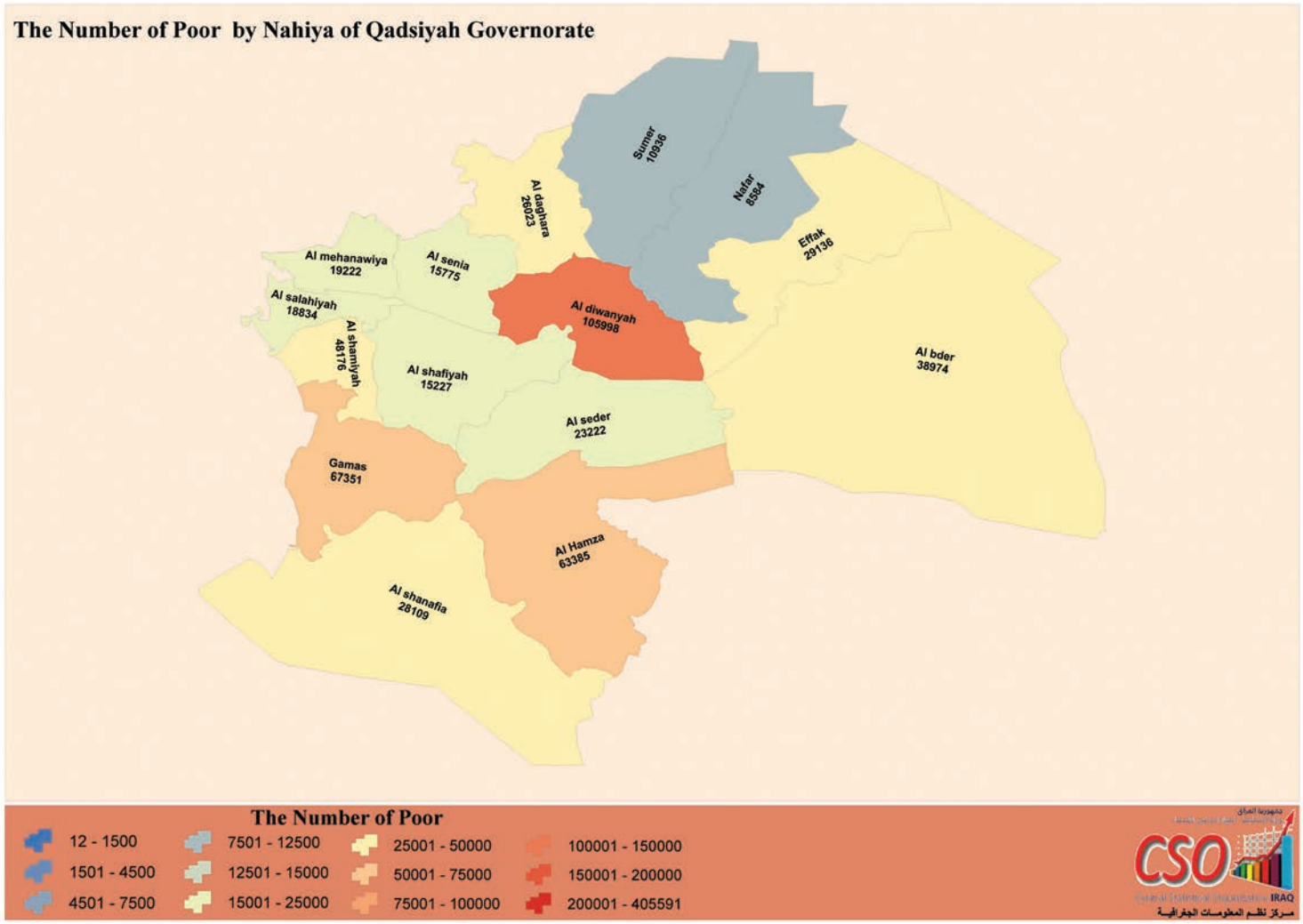
Qadisiya governorate, in south-central Iraq, was until 1976 part of the Diwaniyah governorate along with Muthanna and Najaf. It is one of the five poorest governorates in Iraq. Even the best-off nahiya, al-Diwaniya qadha center, has more than a quarter of its population living below the poverty line, almost 106,000 persons. Eight of fifteen nahiyas in the governorate have estimated poverty rates of 50 percent or more. By far the poorest is Gammas nahiya, with a headcount rate of 77 percent, which

**FIGURE 26: Headcount rate – Qadisiyah**



is also the poorest nahiya in the country. Indeed, 34 percent of Qadisiya's poor live in its five poorest nahiyas—Gammas, Al-Shinafiya, Al-Salahiya, Al-Badair and Al-Sadeer—and al-Diwaniya qadha center alone accounts for a fifth of the poor. High poverty incidence is reflected in the disproportionate number of poor in the governorate; while 3.4 percent of Iraqis resides in Qadisiyah, 8 percent of the poor lives here.

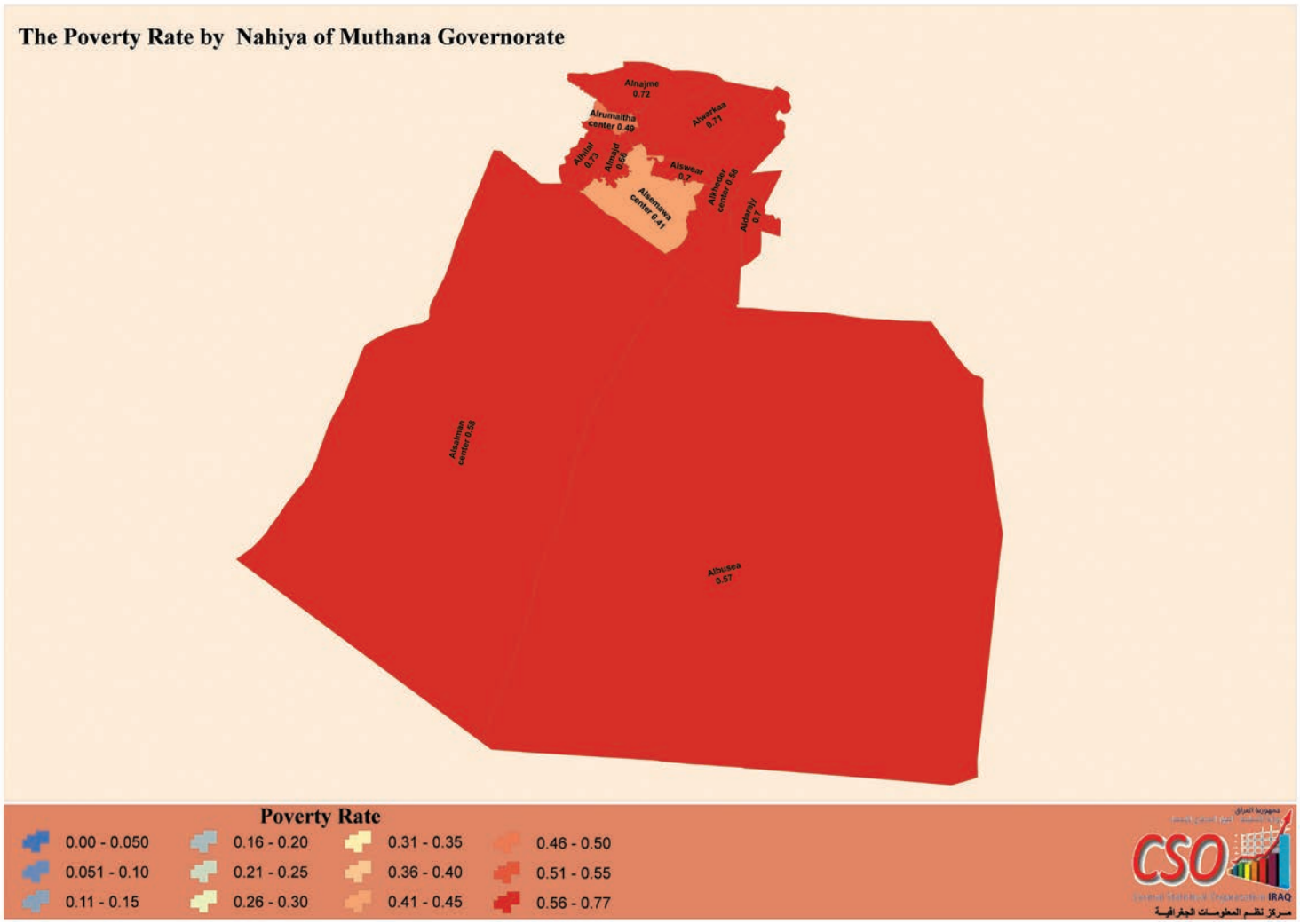
**FIGURE 27: Number of poor – Qadisiyah**



## Muthana

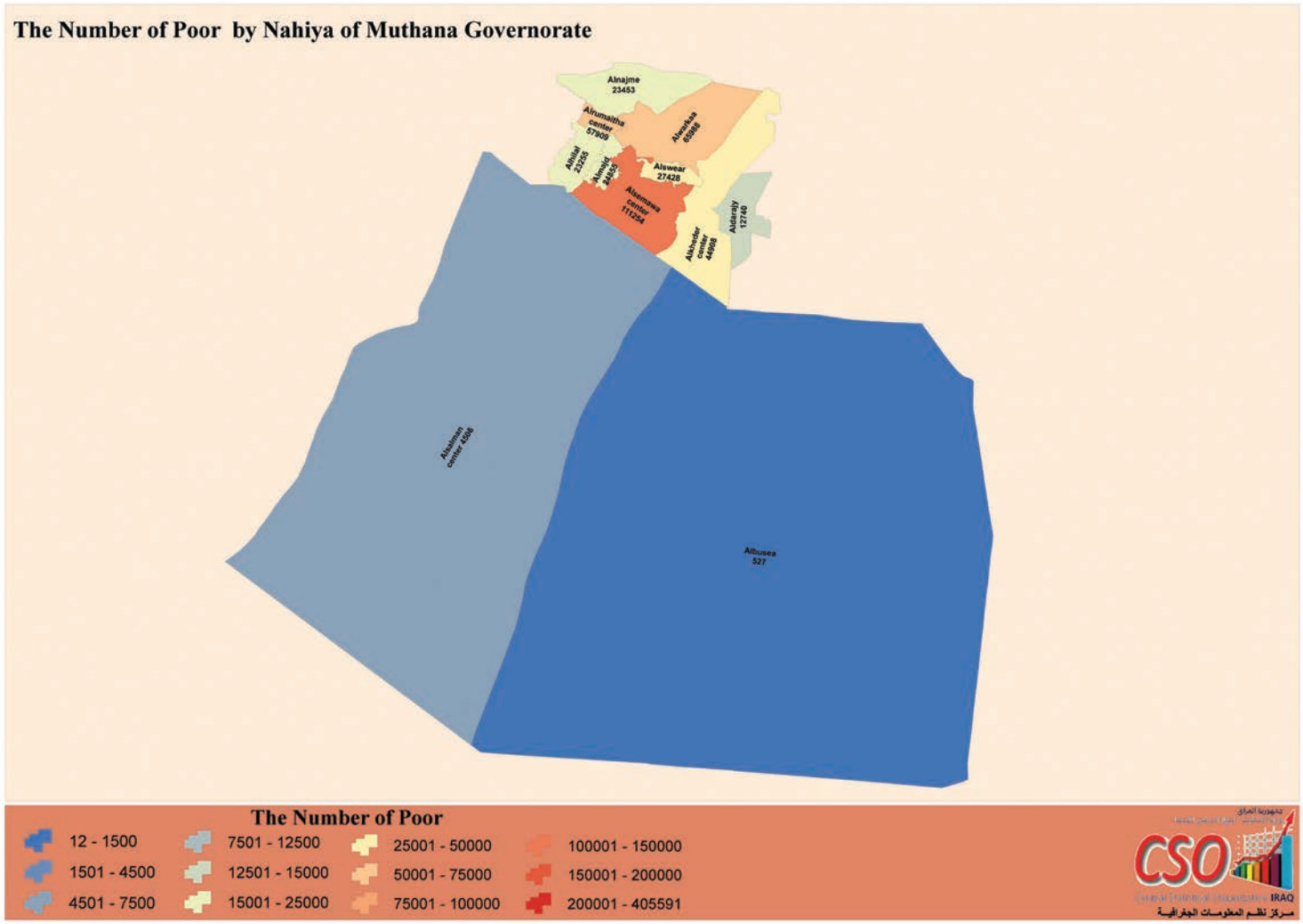
Muthanna governorate is located in southern Iraq and borders Saudi Arabia and Kuwait on the west and south. It is Iraq's poorest governorate, with even the best-off nahiya—al-Samawa qadha center—experiencing poverty rate of 41 percent. Nine out of eleven nahiyas in Muthanna have estimated headcount rate of more than 50 percent. The poorest three nahiyas—al-Warka, al-Najmi, and al-Hilal—with poverty rates of 71, 72 and 73 percent respectively, together account for 113,000 poor persons.

**FIGURE 28: Headcount rate – Muthana**



However, almost as many poor persons live in a single nahiya, al-Samawa qadha center, which is the most populous in the governorate. The proportion of poor Iraqis in Muthana is more than thrice that of the proportion of Iraqis in general, 6.4 percent versus 2.1 percent.

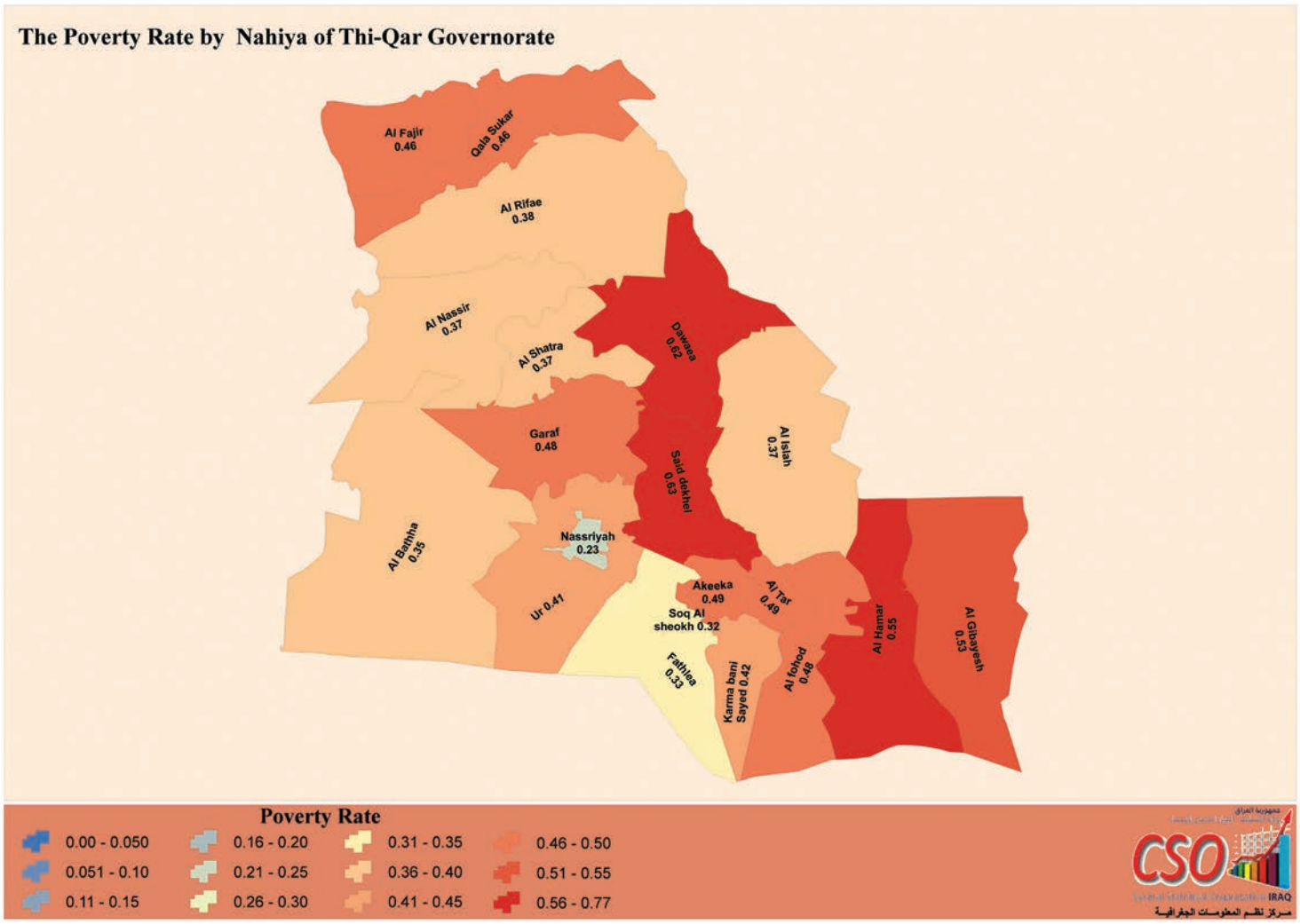
**FIGURE 29: Number of poor – Muthana**



## Thi Qar

Thi Qar governorate in southern Iraq lies north of Basra and east of Muthanna. It is one of Iraq's poorest governorates, although there is significant variation in nahiya level estimates of poverty. For instance, the capital and most populous nahiya, al-Nasiriya qadha center, has a poverty rate of 23 percent. One-fifth of the nahiyas in the governorate have headcount rates above 50 percent and three-fifth of the nahiyas have poverty rates of more than 40 percent. The two poorest nahiyas, al-

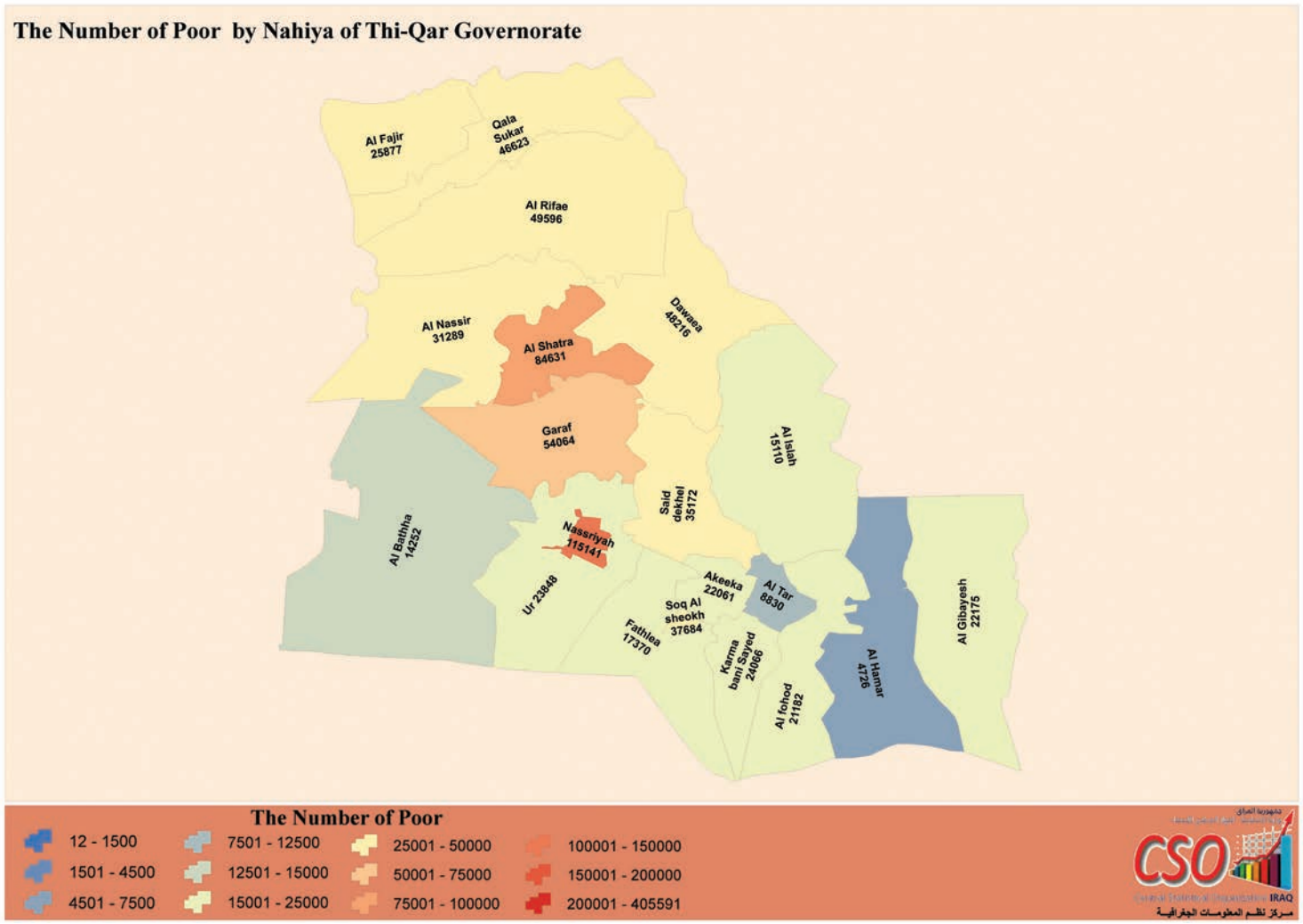
**FIGURE 30: Headcount rate – Thi-Qar**



Dawaya and Said Dekhil, have more than three-fifth of their population living below the poverty line.

Al-Nasiriya qadha center has the lowest headcount rate but highest number of poor people (115,000) because of its population size (499,000). This is apparent in Figures 30 and 31: Al-Nasiriya is shaded in "lightest" color in the headcount rate map while it has the "darkest" hue in the map for number of poor. Eleven percent of the country's poor lives in Thi Qar while it has only 5.5 percent of the country's population.

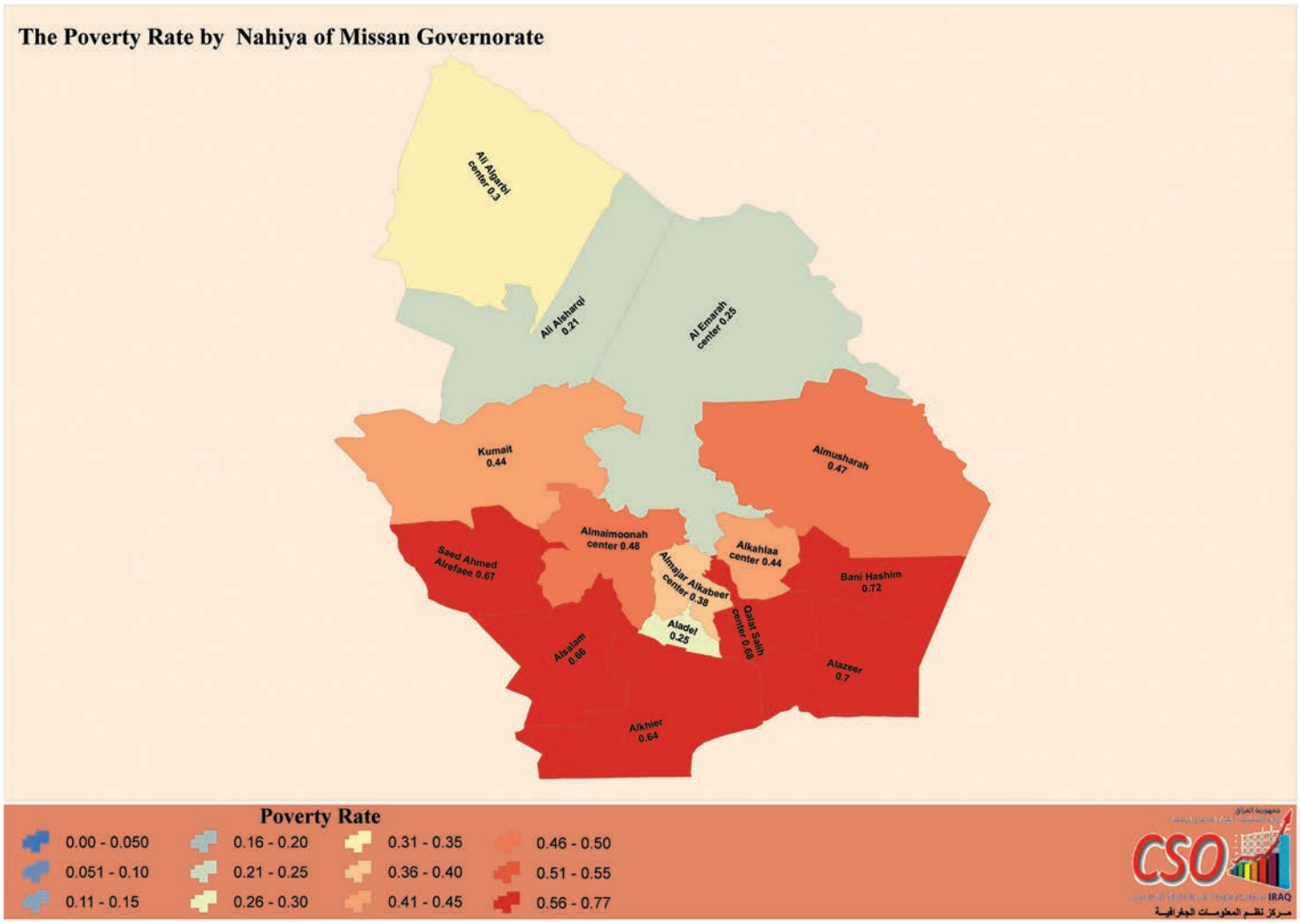
**FIGURE 31: Number of poor – Thi-Qar**



## Missan

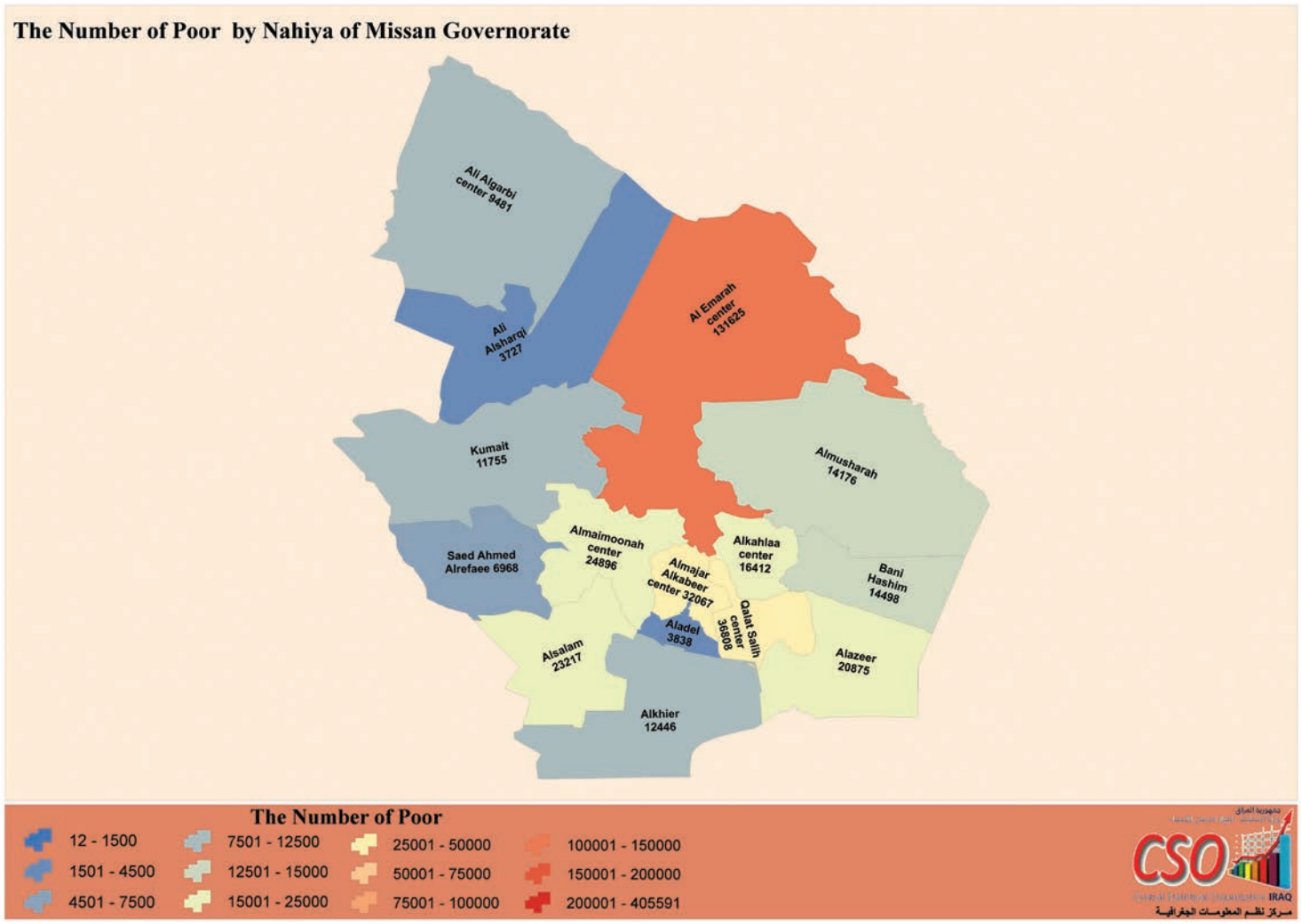
Missan lies in the southeast of Iraq, bordering Iran to the east, and Wasit, Thi-Qar, and Basrah governorates to the north, west, and south respectively. More than a third of Al Ahwar, or Mesopotamian Marshes, of south Iraq falls in Missan governorate. However, the loss of wetlands has led to desertification of arable lands and uprooted many Marsh Arabs from their traditional lands and livelihoods. Despite having rich oil reserve fields, Missan has one of the highest poverty rates in Iraq. The nahiya with

**FIGURE 32: Headcount rate – Missan**



the least headcount rate in Missan is Ali Al-Sharqi (21 percent) whose poverty rate is higher than the national average. More than a third of the nahiyas have headcount rate of more than 60 percent—Al-Khayr (64 percent), Al-Salam (66 percent), Said Ahmed Al-Rifaai (67 percent), Qalat Saleh qadha center (68 percent), Al-Ezair (70 percent), and Bani Hashim (72 percent)—with the two poorest nahiyas bordering Iran. The areas with the most number of poor are all urban centers—Al-Maimouna qadha center (25,000), Al-Mejar Al-Kabir qadha center (32,000), Qalat Saleh qadha center (37,000), and Al-Amara qadha center

**FIGURE 33: Number of poor – Missan**

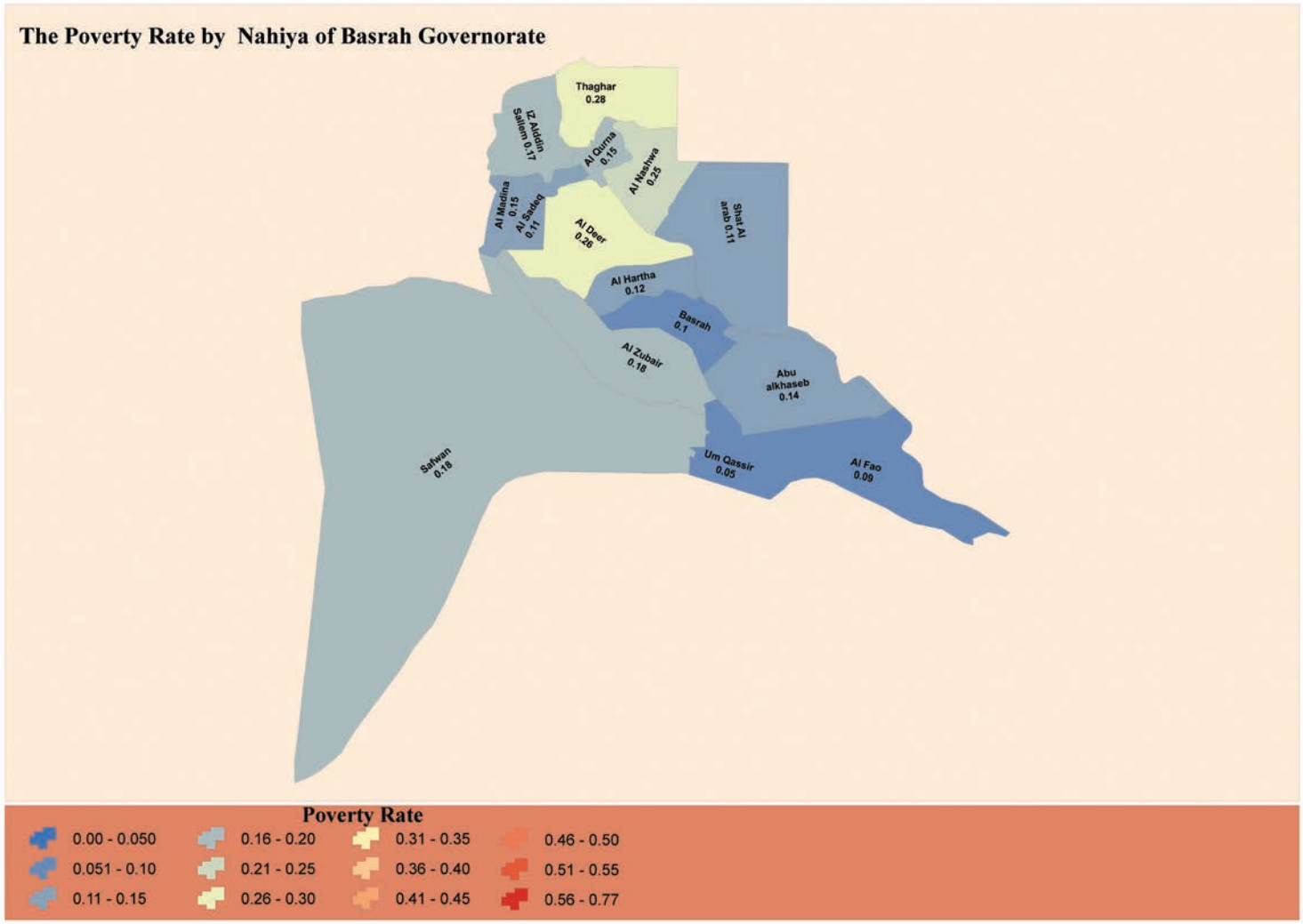


(132,000)—and together they account for 62 percent of the poor in Missan. The nahiya with the fewest number of poor is Ali Al-Sharqi, a product of its low headcount rate (21 percent) and small population size (18,000). Missan is another governorate that has a disproportionate share of the poor: it is home to 2.9 percent of Iraqis but 5.8 percent of the poor.

## Basrah

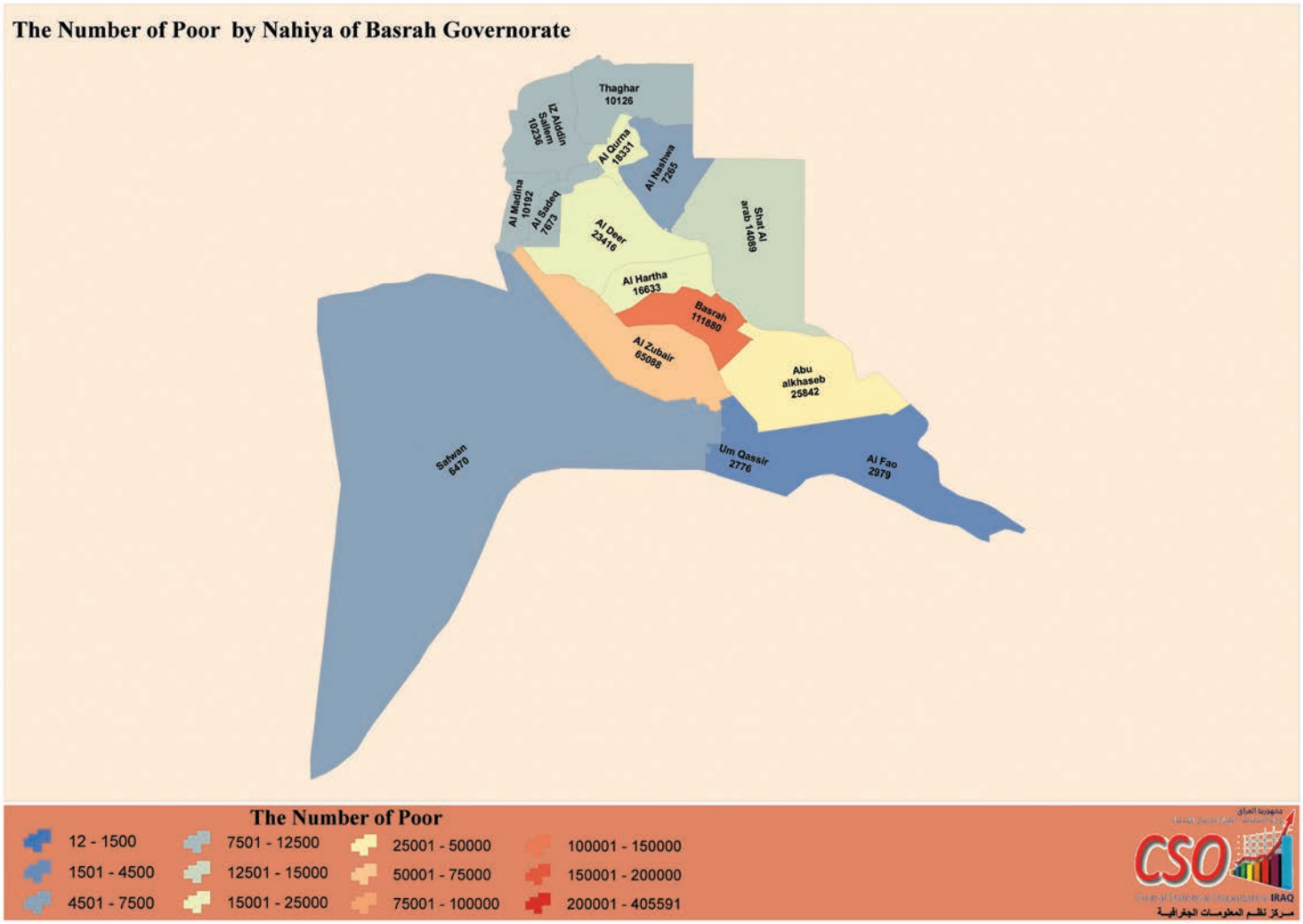
Basrah is Iraq's southernmost governorate, home to Iraq's only seaports, and borders Kuwait to the south and Iran to the east. Unlike the other southern governorates, Basra experienced significant improvements in welfare between 2007 and 2012. Um Qasr nahiya, which is also the location of Um Qasr port, Iraq's only deep water port, has poverty rates as low as 5 percent, and only 2800 poor persons. The three poorest nahiyas—al-Nashwa (25 percent), al-Dair (26 percent), and al-

**FIGURE 34: Headcount rate – Basrah**



Thagar (28 percent)—are all on the interior and border Iran. The largest number of poor people, almost 112,000 persons, live in the capital of the governorate, al-Basra qadha center which is also one of the largest cities in Iraq with a population of 1.2 million. The relative prosperity of Basrah is reflected in less than proportionate share of the poor; Basrah is home to 5.3 percent of the poor and 7.6 percent of Iraqis.

**FIGURE 35: Number of poor – Basrah**



10

# Conclusion

Poverty map is a tool that combines the strengths of household budget survey and population and housing census to estimate poverty rate at small level of geographical disaggregation. Nationally representative budget surveys collect detailed information on household consumption which allows one to estimate poverty rate up to regional and rural/urban levels. On the other hand, census interviews all households but collects information on only a limited set of variables. Small area estimation entails estimating a relationship between household expenditure and observable household characteristics using the budget survey and imposing the relationship in the census to calculate predicted consumption—and poverty status—of each household. The information is then used to estimate average poverty rate at various levels of geographical aggregation. The exercise realizes its full potential when the estimated small area poverty rates are illustrated on a color-coded map. The visual representation of spatial distribution of poverty draws more attention and interest than presenting the information on a table ever could. It can galvanize political will and support for poverty reduction.

The discussion of poverty alleviation touches upon an important issue discussed earlier—the distinction between poor areas and areas where the poor live. Areas that have historically been left out of the mainstream development process exhibit entrenched and widespread poverty. However, areas with the highest poverty rate are not necessarily where most of the poor live because such areas are often sparsely populated. Urban centers and other populated areas might have low poverty rate but may host a large number of poor people due to their population size. The design and placement of programs and policies depend on whether the national priority is to target poor areas or poor people. To facilitate this discussion, the current exercise presents both poverty rate and number of poor at the nahiya level. As one can see from the maps, the areas with the highest poverty rate in Iraq are not always where most of the poor live. Indeed, there is no nahiya in common between ten poorest nahiyas and ten nahiyas with the most number of poor.

Beyond visual illustration of distribution of poverty, the map draws its power because of its usefulness to planners and policy makers. The most obvious use of poverty maps is for the targeting of antipoverty programs. Social protection programs often collect information on proxies of house-

hold welfare to identify poor households. This is to ensure that the funds reach the poorest and that there is minimal leakage to nonpoor and undercoverage of poor. Poverty ranking of small areas can be used to refine the targeting mechanism and improve its efficiency. Geographical targeting can be the "first stage" targeting where a program first identifies the areas with the highest poverty rate before collecting detailed information for household level targeting only in those areas. In areas with high poverty rate and low population density, small area estimation may obviate the need for household level targeting because identifying the poverty status of individual households may be extremely inefficient. Poverty ranking can also help in prioritization of placement and rollout of a program with limited budget; areas with the highest poverty rate can be the first to receive the program or the last to lose it.

The value of poverty map is further boosted when it is combined with other geocoded information like road, electricity, and irrigation networks, schools, health centers, and access to market. Superimposing auxiliary information on poverty map can shed light on the correlates of poverty. For instance, areas with high poverty rate may have poor supply of public services, weak infrastructure network, low access to markets and other opportunities for commerce and mobility. This lets policy makers deliver interventions tailored to fit local needs.

The general caution about correlation not being equal to causation is applicable here as well; while the maps show correlates of poverty, they do not identify its causes. For example, an area may be poor because it does not have extensive road network, but the direction of causality could run in the opposite direction: a poor area with weak tax base may not have the fiscal space to construct roads. The map is also not suited to analyze the impact of an intervention. Robust impact evaluations that provide credible answer to the counterfactual question "What would have been the impact in absence of the program?" need to be designed for the purpose. Again, this is outside the scope of small area estimation method.

Besides targeting and budget allocation, poverty maps have had a broader impact as well. By presenting disaggregated information on poverty in a highly accessible manner, the maps have fostered local debate on the determinants of poverty and consequences of policy. The objective poverty ranking of areas have provided countries the necessary empirical evidence to reform existing resource allocation mechanisms and placement of antipoverty programs. In countries where the maps are updated regularly, it has been possible to evaluate the changes in distribution of poverty over time. The maps have also served as focal instrument to coordinate the activities of multiple agencies. Please refer to Box 1 for international examples on the use of poverty maps.

It should be acknowledged that the numbers reported here are estimates derived from a modeling and imputation process. While great care has been taken to ensure that the estimates are as accurate as possible, including harmonization of survey questions and careful selection of explanatory variables, each prediction comes with a standard error. Therefore, the uncertainty associated with the estimates must be taken into consideration while interpreting the results.

One caveat does uniquely apply to the current work. The budget and household surveys are from 2012 and 2013 respectively, hence the picture presented here represents the state of Iraq as of 2013. The country has gone through many changes since then, and especially since summer of 2014, when Islamic State militants swept through a large swath of the country. This does not negate the value of the map because it still provides a valuable retrospective snapshot of the spatial distribution of poverty. If there is a correlation between violence and poverty and inequity, it sheds light on possible causes or consequences of violence to the extent violence restricts people's ability

BOX 1

## International Experience on Uses of Poverty Maps

Poverty maps have been developed for at least 45 countries in the last fifteen years. Once a map has been developed for a country, it can be put to many uses as the following examples demonstrate.

### Targeting

- **Bulgaria:** "In Bulgaria, poverty maps account for one of five formal criteria used in allocating social infrastructure projects among municipalities…The steering committee of the Social Investment Fund has found that the maps are important in the allocation process because they have helped guarantee an objective ranking among municipality applicants. Indeed, the committee has considered the maps so helpful that it has now integrated the small area poverty estimates into the fund's management information system."
- **Cambodia:** "In Cambodia, the World Food Programme has integrated several maps, including information on infrastructure and vulnerability to flood and drought, into a GIS, along with small area poverty and nutrition maps. It has used the combined information to identify potential areas for its programs. The maps have also been used for resource targeting by, for example, the Ministry of Agriculture, Forestry, and Fisheries.
- **Kenya:** "In Kenya, the allocation formula used in the Constituency Development Fund has been revised so that 25 percent of the allocations are based on the incidence of poverty, and those areas showing higher poverty incidence receive more resources from this portion of the allocations.

### Identification of correlates of poverty

- **Sri Lanka:** "Overlaying the poverty map and a map depicting access to nearby markets or cities has demonstrated that poverty incidence is highly correlated with geographical isolation as measured by distance to the nearest market or city. This has prompted a shift to an emphasis on reaching areas that are more isolated. A similar exercise has been conducted with GIS data on drought patterns."

### Validation of existing targeting mechanism

- **Morocco:** "In Morocco, an analysis of public expenditure and poverty has provided a measure of the extent to which program allocations have matched the patterns of poverty (the targeting differential approach). Morocco has found a strong correlation between poverty and other local data. This has enabled a deeper understanding of local conditions, the evolution of social conditions, and the effectiveness of government programs in reaching poor areas.

(*continued on next page*)

BOX 1

## International Experience on Uses of Poverty Maps (*continued*)

- **Vietnam:** "The poverty map was overlaid with information on communes receiving funds through Program 135. The results of this exercise validated the program's targeting criteria by showing that most communes benefiting from Program 135 were in poor areas and that most poor areas were included in the program, although the analysis did reveal a few gaps in coverage in the Northwest region that needed attention.

### Reform of existing programs

- **Sri Lanka:** "In Sri Lanka, the small area estimates on poverty at the Divisional Secretariat level were compared to the coverage of the Samurdhi transfer program, the largest welfare program in Sri Lanka. Only a weak correlation was found between the areas targeted by the program and the areas ranked as the poorest in the poverty map. This helped quantify the extent of mistargeting in the Samurdhi program with regard to both undercoverage and leakage. As a result, the formulas for the allocation of funds in the program were modified. This was very sensitive politically, as many people stood to receive reduced benefits or none at all because of the changes in the allocation criteria. As a compromise, allocations remained fairly constant for existing recipient areas, but the poorest of these areas saw an increase in funding."

### Monitoring poverty over time

- **Ecuador:** "Ecuador was one of the first countries to construct a series (or panel) of poverty maps. It used data from 1990 and 2001, and the two maps helped identify areas where there had been a significant increase in poverty over that time (for example, urban areas in the Coast Region, where the 1990 poverty rates were lower), as well as areas where poverty had remained largely unchanged (such as rural areas in the Coast Region, where the 1990 poverty rates were higher)."

### Inter-agency coordination

- **Mexico:** "…the president of Mexico has developed a plan to reduce poverty and promote human development by focusing on the 50 municipalities with the highest poverty rates and the lowest human development indexes. Seven ministries operating 12 different but related programs now focus as a priority on the poor in these 50 municipal areas. These seven ministries have had to coordinate the 12 programs to meet the targets set out in the plan. Previously, each ministry and program had its own priorities and objectives that were implemented in isolation.

(*continued on next page*)

BOX 1

## International Experience on Uses of Poverty Maps *(continued)*

- **South Africa:** "Data and maps on poverty, sanitation, clean water, and the incidence of cholera were used to help contain the spread of cholera in KwaZulu-Natal Province in South Africa in January 2001. Poverty and cholera data sets showed that the cholera outbreak had followed a river floodplain and was moving through poor areas toward other poor areas. The use of the data sets assisted in producing a swift, well-coordinated response by national and local government departments (health, water, and so on)..."

### Sparking conversation on poverty

- **Morocco:** "Although there is less poverty in Morocco than in most countries in Africa, the poverty map in Morocco has highlighted the problem of persistent poverty and sparked a national conversation on poverty. King Mohammed VI has taken an especially keen interest, and the poverty maps have been used to help design and allocate the budget for his signature program, the National Human Development Initiative.
- **Vietnam:** "In Vietnam, poverty maps have revealed high levels of inequality both across and within regions. This strong message has resonated with many users and provided empirical evidence of patterns that were only suspected, but never documented.

*Source*: More than a Pretty Picture (Bedi, Coudouel, & Simler, 2007).

to move in search of opportunities, discourage investment, and hinder mutually beneficial transactions due to distrust in contract enforcement. The map is likely a more faithful representation of the current situation in the Southern governorates because they have been relatively insulated from the recent spate of violence that has convulsed the rest of the country.

It also points to the need for collecting detailed data at high frequency to be able to understand the changing circumstances and respond to it appropriately. For best effect, the map must be updated frequently so that there is timely information on the trends of poverty and other socioeconomic indicators. New technology like mobile phone surveys and computer assisted telephone interview (CAPI) can be used to reduce security risk and overcome logistical challenges associated with frequent surveys.

The Government of Iraq's effort to measure poverty and understand its causes through regular household expenditure surveys and comprehensive poverty assessment reports is highly commendable. It is also committed to understanding the changing poverty landscape by conducting expenditure surveys at high frequency and using advanced imputation methods to estimate poverty. This will help the government be prepared and devise appropriate response in crisis and emergency situations.

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# Appendices

# Appendix A: Headcount Rate and Number of Poor (by Nahiya)

**TABLE A1: Duhouk**

| Nahiya | Population | Headcount rate | Std. Err. | [95% Conf. Interval] | | Number of poor |
|---|---|---|---|---|---|---|
| Duhouk Qadha Center | 299220 | 0.04 | 0.02 | 0.00 | 0.07 | 10622 |
| Zawita Nahia | 18040 | 0.03 | 0.02 | 0.00 | 0.08 | 621 |
| Mankishki Nahia | 11669 | 0.05 | 0.03 | 0.00 | 0.11 | 607 |
| Sumeil Qadha Center | 72531 | 0.04 | 0.02 | 0.00 | 0.08 | 2938 |
| Bateel Nahia | 22113 | 0.12 | 0.04 | 0.03 | 0.20 | 2558 |
| Zakhow Qadha Center | 192126 | 0.06 | 0.03 | 0.01 | 0.11 | 11566 |
| Rizgary Nahia | 21072 | 0.09 | 0.04 | 0.00 | 0.17 | 1856 |
| Darkar (AL Syndi) Nahia | 16929 | 0.07 | 0.03 | 0.00 | 0.14 | 1227 |
| Batifa Nahia | 22876 | 0.07 | 0.03 | 0.00 | 0.13 | 1533 |
| Al-Amadia Qadha Center | 9306 | 0.03 | 0.02 | 0.00 | 0.07 | 263 |
| Sarsank Nahia | 21785 | 0.03 | 0.02 | 0.00 | 0.07 | 741 |
| Kani Massi Nahia | 12658 | 0.05 | 0.03 | 0.00 | 0.12 | 676 |
| Dirluk Nahia | 53465 | 0.06 | 0.03 | 0.00 | 0.12 | 3106 |
| Jamanki Nahia | 4846 | 0.04 | 0.03 | 0.00 | 0.10 | 203 |
| Bamerli Nahia | 7459 | 0.05 | 0.03 | 0.00 | 0.12 | 374 |
| Qasrouk Nahia | 67510 | 0.10 | 0.04 | 0.02 | 0.18 | 6683 |
| Atreesh Nahia | 12906 | 0.06 | 0.04 | 0.00 | 0.14 | 820 |
| Baotheri Nahia | 13344 | 0.09 | 0.04 | 0.01 | 0.17 | 1182 |
| Akry Qadha Center | 64505 | 0.05 | 0.02 | 0.00 | 0.09 | 2922 |
| Dinarta Nahia | 22972 | 0.08 | 0.04 | 0.00 | 0.17 | 1881 |

(*continued on next page*)

**TABLE A1: Duhouk** *(continued)*

| Nahiya | Population | Headcount rate | Std. Err. | [95% Conf. Interval] | | Number of poor |
|---|---|---|---|---|---|---|
| Bijeel Nahia | 16681 | 0.09 | 0.05 | 0.00 | 0.18 | 1458 |
| Kurdseen Nahia | 40772 | 0.09 | 0.03 | 0.03 | 0.16 | 3808 |
| Bardarash Qadha Center | 26359 | 0.05 | 0.03 | 0.00 | 0.11 | 1381 |
| Darto Nahia | 30074 | 0.10 | 0.04 | 0.02 | 0.18 | 2938 |
| Rofia Nahia | 31480 | 0.09 | 0.04 | 0.02 | 0.16 | 2843 |
| kalak Nahia | 29623 | 0.10 | 0.04 | 0.01 | 0.19 | 2915 |

**TABLE A2: Nineveh**

| Nahiya | Population | Headcount rate | Std. Err. | [95% Confidence Interval] | | Number of poor |
|---|---|---|---|---|---|---|
| Al-Mosal Qadha Center | 1289229 | 0.31 | 0.07 | 0.17 | 0.46 | 405591 |
| Bashiqa Nahia | 110189 | 0.43 | 0.07 | 0.29 | 0.58 | 47602 |
| Al-Shoura Nahia | 58213 | 0.48 | 0.07 | 0.34 | 0.62 | 28082 |
| Hammam Al-Alil | 73064 | 0.42 | 0.07 | 0.29 | 0.56 | 30884 |
| Al-Qayarra Nahia | 127842 | 0.48 | 0.06 | 0.36 | 0.60 | 61108 |
| Al-Mahalabia Nahia | 34401 | 0.49 | 0.07 | 0.35 | 0.63 | 16912 |
| Al-Hamdania Qadha Center | 87698 | 0.20 | 0.05 | 0.10 | 0.29 | 17162 |
| Namroiud Nahia | 62616 | 0.32 | 0.07 | 0.18 | 0.47 | 20150 |
| Bartilla Nahia | 67056 | 0.39 | 0.07 | 0.25 | 0.53 | 26172 |
| Tilkaif Qadha Center | 83858 | 0.27 | 0.06 | 0.16 | 0.39 | 22935 |
| Wana Nahia | 49132 | 0.26 | 0.05 | 0.16 | 0.37 | 12976 |
| Alkoush Nahia | 63086 | 0.40 | 0.06 | 0.27 | 0.53 | 25487 |
| Sinjar Qadha Center | 75760 | 0.37 | 0.07 | 0.23 | 0.51 | 27986 |
| Al-Shamal Nahia | 141128 | 0.62 | 0.06 | 0.49 | 0.75 | 87852 |
| Al-Qairawan Nahia | 62793 | 0.58 | 0.06 | 0.46 | 0.70 | 36527 |
| Telafar Qadha Center | 193602 | 0.49 | 0.08 | 0.32 | 0.66 | 95078 |

(*continued on next page*)

**TABLE A2: Nineveh** *(continued)*

| Nahiya | Population | Headcount rate | Std. Err. | [95% Confidence Interval] | | Number of poor |
|---|---|---|---|---|---|---|
| Zummar Nahia | 135063 | 0.50 | 0.07 | 0.36 | 0.64 | 67788 |
| Rabia Nahia | 77796 | 0.50 | 0.08 | 0.35 | 0.66 | 39077 |
| Al-Ayadiya Nahia | 52393 | 0.51 | 0.07 | 0.37 | 0.65 | 26841 |
| Al-Shaikhan Qadha Center | 24777 | 0.13 | 0.04 | 0.04 | 0.22 | 3209 |
| Zaylakan Nahia | 16021 | 0.28 | 0.07 | 0.13 | 0.43 | 4467 |
| Al-Hatra Qadha Center | 18306 | 0.31 | 0.07 | 0.16 | 0.45 | 5594 |
| Al-Tal Nahia | 32204 | 0.40 | 0.08 | 0.24 | 0.56 | 12856 |
| Al-Baaj Qadha Center | 59136 | 0.64 | 0.07 | 0.50 | 0.77 | 37817 |
| Al-Qahtanya Nahia | 70626 | 0.60 | 0.08 | 0.44 | 0.76 | 42708 |
| Makhmoor Qadha Center | 46387 | 0.17 | 0.05 | 0.06 | 0.27 | 7714 |
| Al-Kuwair Nahia | 71330 | 0.22 | 0.06 | 0.11 | 0.33 | 15878 |
| Kandinawa Nahia | 17584 | 0.08 | 0.04 | 0.00 | 0.16 | 1408 |
| Qaraj Nahia | 33540 | 0.33 | 0.07 | 0.19 | 0.46 | 10911 |
| Mula-Qara Nahia | 23818 | 0.23 | 0.07 | 0.10 | 0.36 | 5473 |
| Faidah Nahia | 75937 | 0.15 | 0.05 | 0.05 | 0.26 | 11618 |

**TABLE A3: Erbil**

| Nahiya | Population | Headcount rate | Std. Err. | [95% Confidence Interval] | | Number of poor |
|---|---|---|---|---|---|---|
| Arbil Qadha Center | 730106 | 0.03 | 0.02 | 0.00 | 0.07 | 19786 |
| Bahraka Nahia | 48502 | 0.04 | 0.02 | 0.00 | 0.08 | 1809 |
| Ainkawa Nahia | 25134 | 0.01 | 0.01 | 0.00 | 0.02 | 133 |
| Shamamak Nahia | 52607 | 0.07 | 0.03 | 0.00 | 0.13 | 3593 |
| Dashti Hawler Qadha Center | 49736 | 0.04 | 0.03 | 0.00 | 0.09 | 1925 |
| Darroo Nahia | 52723 | 0.05 | 0.04 | 0.00 | 0.11 | 2409 |
| Qoshtaba Nahia | 27918 | 0.07 | 0.04 | 0.00 | 0.15 | 1854 |
| Kasnasan Nahia | 60455 | 0.05 | 0.04 | 0.00 | 0.13 | 3156 |
| Sowran Qadha Center | 48970 | 0.04 | 0.03 | 0.00 | 0.10 | 1915 |
| Khalifan Nahia | 33735 | 0.08 | 0.04 | 0.00 | 0.16 | 2776 |
| Diyana Nahia | 58559 | 0.05 | 0.03 | 0.00 | 0.10 | 2998 |
| Siakan Nahia | 13094 | 0.11 | 0.06 | 0.00 | 0.23 | 1438 |
| Shaqlawa Qadha Center | 21205 | 0.03 | 0.02 | 0.00 | 0.07 | 568 |
| Salah-eldeen Nahia | 47309 | 0.04 | 0.02 | 0.00 | 0.08 | 1698 |
| Harir Nahia | 32861 | 0.06 | 0.03 | 0.00 | 0.12 | 1896 |
| Hyran Nahia | 4688 | 0.05 | 0.04 | 0.00 | 0.12 | 238 |
| Bamarsa Nahia | 17813 | 0.08 | 0.05 | 0.00 | 0.18 | 1495 |
| Balisan Nahia | 4534 | 0.08 | 0.05 | 0.00 | 0.19 | 372 |
| Choman Qadha Center | 10457 | 0.03 | 0.03 | 0.00 | 0.09 | 365 |
| Haj Omran Nahia | 3401 | 0.06 | 0.04 | 0.00 | 0.13 | 196 |
| Samilan Nahia | 4669 | 0.07 | 0.05 | 0.00 | 0.16 | 344 |
| Galala Nahia | 1772 | 0.05 | 0.04 | 0.00 | 0.13 | 93 |

(*continued on next page*)

**TABLE A3: Erbil** *(continued)*

| Nahiya | Population | Headcount rate | Std. Err. | [95% Confidence Interval] | | Number of poor |
|---|---|---|---|---|---|---|
| Qasry Nahia | 5669 | 0.05 | 0.04 | 0.00 | 0.12 | 262 |
| Kuwaisinjaq Qadha Center | 56966 | 0.02 | 0.02 | 0.00 | 0.06 | 1396 |
| Taq-Taq Nahia | 22993 | 0.06 | 0.04 | 0.00 | 0.14 | 1423 |
| Shorash Nahia | 5947 | 0.11 | 0.06 | 0.00 | 0.23 | 635 |
| Ashty Nahia | 4199 | 0.08 | 0.05 | 0.00 | 0.19 | 354 |
| Saktan Nahia | 2371 | 0.07 | 0.05 | 0.00 | 0.17 | 164 |
| Sikerdkan Nahia | 3401 | 0.11 | 0.06 | 0.00 | 0.23 | 367 |
| Meirkasoor Qadha Center | 1394 | 0.04 | 0.04 | 0.00 | 0.11 | 57 |
| Barazan Nahia | 21484 | 0.05 | 0.03 | 0.00 | 0.11 | 1100 |
| Biran Nahia | 6523 | 0.06 | 0.04 | 0.00 | 0.13 | 372 |
| Sherwan Mazin Nahia | 3616 | 0.03 | 0.03 | 0.00 | 0.09 | 114 |
| Mazni Nahia | 5571 | 0.07 | 0.04 | 0.00 | 0.15 | 402 |
| Koratoo Nahia | 9713 | 0.03 | 0.02 | 0.00 | 0.08 | 301 |
| Khabat Qadha Center | 38333 | 0.08 | 0.05 | 0.00 | 0.18 | 2948 |
| Darashakran Nahia | 8446 | 0.07 | 0.04 | 0.00 | 0.14 | 609 |
| Rizkari Nahia | 35460 | 0.07 | 0.04 | 0.00 | 0.15 | 2408 |
| Korakosak Nahia | 16358 | 0.06 | 0.04 | 0.00 | 0.14 | 1009 |
| Rawandoz Qadha Center | 17994 | 0.05 | 0.03 | 0.00 | 0.10 | 826 |
| Warny Nahia | 5100 | 0.06 | 0.04 | 0.00 | 0.14 | 315 |

**TABLE A4: Sulaimaniya**

| Nahiya | Population | Headcount rate | Std. Err. | [95% Confidence Interval] | | Number of poor |
|---|---|---|---|---|---|---|
| Sulaimania Qadha Center | 598051 | 0.00 | 0.00 | 0.00 | 0.01 | 2930 |
| Bakrago Nahia | 89179 | 0.01 | 0.01 | 0.00 | 0.02 | 847 |
| Bazyan Nahia | 36939 | 0.02 | 0.02 | 0.00 | 0.05 | 628 |
| Tanjro Nahia | 43289 | 0.02 | 0.02 | 0.00 | 0.06 | 1043 |
| Qaradagh Qadha Center | 7294 | 0.01 | 0.01 | 0.00 | 0.04 | 93 |
| Siasitan Nahia | 2170 | 0.01 | 0.01 | 0.00 | 0.04 | 27 |
| Sharazoor Qadha Center | 38712 | 0.01 | 0.01 | 0.00 | 0.04 | 538 |
| Warma Nahia | 26153 | 0.02 | 0.01 | 0.00 | 0.04 | 408 |
| Said Sadiq Qadha Center | 72903 | 0.02 | 0.02 | 0.00 | 0.05 | 1546 |
| Sarjook Nahia | 3676 | 0.04 | 0.03 | 0.00 | 0.10 | 161 |
| Halabja Qadha Center | 59871 | 0.00 | 0.00 | 0.00 | 0.01 | 204 |
| Sirwan Nahia | 12329 | 0.01 | 0.01 | 0.00 | 0.03 | 129 |
| Khormal Nahia | 19787 | 0.01 | 0.01 | 0.00 | 0.03 | 186 |
| Biara Nahia | 6831 | 0.00 | 0.01 | 0.00 | 0.02 | 27 |
| Benjween Qadha Center | 25336 | 0.02 | 0.01 | 0.00 | 0.04 | 400 |
| Karmak Nahia | 10813 | 0.06 | 0.04 | 0.00 | 0.14 | 650 |
| Talbraiz Nahia | 5989 | 0.07 | 0.05 | 0.00 | 0.17 | 418 |
| Jowarta Nahia | 8051 | 0.01 | 0.01 | 0.00 | 0.03 | 97 |
| Sioutil Nahia | 2243 | 0.01 | 0.01 | 0.00 | 0.04 | 26 |
| Sitek Nahia | 5015 | 0.02 | 0.02 | 0.00 | 0.05 | 98 |
| Zalan Nahia | 1539 | 0.02 | 0.02 | 0.00 | 0.06 | 36 |
| Kabiloon Nahia | 3328 | 0.03 | 0.03 | 0.00 | 0.08 | 107 |

(*continued on next page*)

**TABLE A4: Sulaimaniya** *(continued)*

| Nahiya | Population | Headcount rate | Std. Err. | [95% Confidence Interval] | | Number of poor |
|---|---|---|---|---|---|---|
| Mout Qadha Center | 9230 | 0.02 | 0.02 | 0.00 | 0.06 | 186 |
| Qalat-Diza Nahia | 67252 | 0.01 | 0.01 | 0.00 | 0.04 | 888 |
| Hero Nahia | 1833 | 0.03 | 0.03 | 0.00 | 0.08 | 47 |
| Halashow Nahia | 8488 | 0.04 | 0.04 | 0.00 | 0.11 | 334 |
| Tharaow Nahia | 12350 | 0.03 | 0.02 | 0.00 | 0.07 | 326 |
| Nawadesht Nahia | 22015 | 0.04 | 0.03 | 0.00 | 0.10 | 896 |
| Eisiway Nahia | 2707 | 0.03 | 0.03 | 0.00 | 0.09 | 71 |
| Ranya Qadha Center | 83175 | 0.02 | 0.01 | 0.00 | 0.04 | 1289 |
| Jwar Qorna Nahia | 49135 | 0.02 | 0.01 | 0.00 | 0.04 | 875 |
| Haji Awa Nahia | 55781 | 0.02 | 0.02 | 0.00 | 0.05 | 1261 |
| Betwata Nahia | 17729 | 0.03 | 0.02 | 0.00 | 0.08 | 587 |
| Serkabkan Nahia | 7470 | 0.02 | 0.02 | 0.00 | 0.06 | 167 |
| Dukan Qadha Center | 12308 | 0.01 | 0.01 | 0.00 | 0.02 | 94 |
| Sordash Nahia | 5291 | 0.03 | 0.02 | 0.00 | 0.08 | 156 |
| Bira Magroon Nahia | 30431 | 0.02 | 0.02 | 0.00 | 0.05 | 630 |
| Khalakan Nahia | 4985 | 0.02 | 0.01 | 0.00 | 0.05 | 95 |
| Khadran Nahia | 2962 | 0.05 | 0.03 | 0.00 | 0.12 | 161 |
| Bengrad Nahia | 7402 | 0.05 | 0.03 | 0.00 | 0.10 | 335 |
| Derbendikhan Qadha Center | 42533 | 0.01 | 0.01 | 0.00 | 0.02 | 276 |
| Bawkhosheen Nahia | 1116 | 0.01 | 0.01 | 0.00 | 0.04 | 12 |
| Kalar Qadha Center | 131823 | 0.01 | 0.01 | 0.00 | 0.02 | 936 |
| Rizgary Nahia | 37248 | 0.02 | 0.01 | 0.00 | 0.04 | 570 |

*(continued on next page)*

**TABLE A4: Sulaimaniya** *(continued)*

| Nahiya | Population | Headcount rate | Std. Err. | [95% Confidence Interval] | | Number of poor |
|---|---|---|---|---|---|---|
| Bibaz Nahia | 7234 | 0.01 | 0.01 | 0.00 | 0.03 | 95 |
| Shaikh Taweel Nahia | 2520 | 0.05 | 0.04 | 0.00 | 0.12 | 128 |
| Kifry Qadha Center | 33236 | 0.01 | 0.01 | 0.00 | 0.04 | 469 |
| Awaseby Nahia | 968 | 0.15 | 0.07 | 0.00 | 0.29 | 142 |
| Serqalat Nahia | 7979 | 0.04 | 0.03 | 0.00 | 0.09 | 299 |
| Neowjool Nahia | 1993 | 0.07 | 0.04 | 0.00 | 0.16 | 142 |
| Kokas Nahia | 7801 | 0.10 | 0.04 | 0.02 | 0.18 | 786 |
| Chamchamal Qadha Center | 60753 | 0.01 | 0.01 | 0.00 | 0.03 | 711 |
| Shorash Nahia | 49702 | 0.02 | 0.01 | 0.00 | 0.05 | 910 |
| Sangaw Nahia | 5680 | 0.09 | 0.04 | 0.00 | 0.17 | 490 |
| Takiya Nahia | 26767 | 0.03 | 0.02 | 0.00 | 0.07 | 822 |
| Aghcheler Nahia | 9015 | 0.05 | 0.03 | 0.00 | 0.12 | 469 |
| Qader Karam Nahia | 2403 | 0.08 | 0.04 | 0.00 | 0.16 | 198 |
| Takiya Jabara Nahia | 893 | 0.04 | 0.04 | 0.00 | 0.11 | 37 |
| Khanaqeen Qadha Center | 6654 | 0.03 | 0.02 | 0.00 | 0.06 | 172 |
| Bamow Nahia | 909 | 0.03 | 0.03 | 0.00 | 0.10 | 30 |
| Qoratoo Nahia | 6085 | 0.05 | 0.03 | 0.00 | 0.11 | 297 |

**TABLE A5: Diyala**

| Nahiya | Population | Headcount rate | Std. Err. | [95% Confidence Interval] | | Number of poor |
|---|---|---|---|---|---|---|
| Baquba Qadha Center | 259528 | 0.15 | 0.06 | 0.01 | 0.28 | 37683 |
| Kanan Nahia | 42543 | 0.22 | 0.08 | 0.05 | 0.38 | 9168 |
| Beni Saad Nahia | 130545 | 0.29 | 0.09 | 0.11 | 0.46 | 37754 |
| Buhruz (Ashnouna) Nahia | 46926 | 0.17 | 0.07 | 0.04 | 0.30 | 8071 |
| Al-Abara Nahia | 67101 | 0.20 | 0.07 | 0.06 | 0.35 | 13642 |
| Al-Muqdadya Qadha Center | 148794 | 0.23 | 0.08 | 0.07 | 0.39 | 34327 |
| Abi Seda Nahia | 38845 | 0.17 | 0.07 | 0.03 | 0.32 | 6732 |
| Al-Wajihia Nahia | 37260 | 0.24 | 0.08 | 0.06 | 0.40 | 8764 |
| Al-Khalis Qadha Center | 126554 | 0.20 | 0.08 | 0.02 | 0.38 | 25577 |
| Al-Mansuriya Nahia | 54557 | 0.30 | 0.09 | 0.11 | 0.49 | 16503 |
| Hibhib Nahia | 86691 | 0.18 | 0.08 | 0.03 | 0.34 | 15977 |
| Al-Sad Al-Adim Nahia | 18385 | 0.29 | 0.10 | 0.07 | 0.49 | 5240 |
| Al-Salam Nahia | 23090 | 0.22 | 0.08 | 0.06 | 0.37 | 5057 |
| Khanaqin Qadha Center | 82949 | 0.10 | 0.05 | 0.01 | 0.19 | 8461 |
| Jalawla Nahia | 83675 | 0.24 | 0.09 | 0.05 | 0.41 | 19722 |
| Al-Saadiya Nahia | 47213 | 0.24 | 0.08 | 0.08 | 0.40 | 11454 |
| Baladrooz Qadha Center | 89294 | 0.23 | 0.08 | 0.08 | 0.39 | 20707 |
| Mendili Nahia | 33246 | 0.32 | 0.10 | 0.12 | 0.52 | 10788 |
| Qazania Nahia | 14541 | 0.27 | 0.08 | 0.10 | 0.43 | 3932 |
| Qarataba Nahia | 28922 | 0.17 | 0.07 | 0.04 | 0.30 | 4943 |
| Jabbara Nahia | 7585 | 0.18 | 0.07 | 0.02 | 0.32 | 1333 |

**TABLE A6: Kirkuk**

| Nahiya | Population | Headcount rate | Std. Err. | [95% Confidence Interval] | | Number of poor |
|---|---|---|---|---|---|---|
| Kirkuk Qadha Center | 886618 | 0.05 | 0.01 | 0.03 | 0.08 | 47877 |
| Yaychi Nahia | 25903 | 0.10 | 0.03 | 0.04 | 0.17 | 2684 |
| Alton Kupry | 38224 | 0.02 | 0.01 | 0.00 | 0.04 | 849 |
| Al-Multaka (Mula Abdullah) Nahia | 15271 | 0.19 | 0.04 | 0.10 | 0.27 | 2866 |
| Taza Khormato Nahia | 32208 | 0.11 | 0.03 | 0.05 | 0.17 | 3485 |
| Laylan Nahia | 19802 | 0.09 | 0.03 | 0.02 | 0.15 | 1711 |
| Shwan Nahia | 11296 | 0.05 | 0.02 | 0.01 | 0.10 | 604 |
| Qara Hanjeer (Al-Rabee) Nahia | 10949 | 0.05 | 0.02 | 0.01 | 0.10 | 558 |
| Al-Hawiga Qadha Center | 95854 | 0.13 | 0.03 | 0.07 | 0.18 | 12020 |
| Al-Abbasi Nahia | 49339 | 0.23 | 0.05 | 0.14 | 0.33 | 11560 |
| Al-Riyadh Nahia | 44931 | 0.25 | 0.05 | 0.15 | 0.34 | 11022 |
| Al-Zab Nahia | 52758 | 0.16 | 0.04 | 0.09 | 0.23 | 8383 |
| Daquq Qadha Center | 54860 | 0.15 | 0.03 | 0.08 | 0.21 | 8229 |
| Al-Rashad Nahia | 23204 | 0.27 | 0.05 | 0.17 | 0.36 | 6163 |
| Dibis Qadha Center | 45048 | 0.13 | 0.03 | 0.07 | 0.19 | 5888 |
| Sarkran (Al-Qudis) Nahia | 18037 | 0.10 | 0.03 | 0.04 | 0.15 | 1719 |

**TABLE A7: Anbar**

| Nahiya | Population | Headcount rate | Std. Err. | [95% Confidence Interval] | | Number of poor |
|---|---|---|---|---|---|---|
| Al-Ramadi Qadha Center | 368374 | 0.15 | 0.05 | 0.05 | 0.25 | 54556 |
| Al-Habbaniya Nahia | 136466 | 0.16 | 0.05 | 0.06 | 0.26 | 21589 |
| Al-waffa Nahia | 9749 | 0.48 | 0.10 | 0.27 | 0.69 | 4702 |
| Heet Qadha Center | 80563 | 0.17 | 0.05 | 0.07 | 0.26 | 13663 |
| Baghdady Nahia | 28616 | 0.12 | 0.05 | 0.02 | 0.23 | 3497 |
| Kubaisa Nahia | 14632 | 0.14 | 0.05 | 0.05 | 0.23 | 2035 |
| Al-Forat Nahia | 24713 | 0.28 | 0.07 | 0.13 | 0.42 | 6937 |
| Al-Falluja Qadha Center | 293877 | 0.17 | 0.05 | 0.08 | 0.26 | 49107 |
| Al-Amirya Nahia | 78756 | 0.13 | 0.05 | 0.04 | 0.23 | 10412 |
| Al-Saklawiya Nahia | 49361 | 0.19 | 0.07 | 0.06 | 0.32 | 9522 |
| Al-Garma Nahia | 139664 | 0.46 | 0.12 | 0.21 | 0.70 | 63757 |
| Ana Qadha Center | 31336 | 0.08 | 0.03 | 0.02 | 0.14 | 2479 |
| Haditha Qadha Center | 50095 | 0.11 | 0.04 | 0.03 | 0.19 | 5606 |
| Al-Haqlaniya Nahia | 29185 | 0.09 | 0.03 | 0.03 | 0.15 | 2542 |
| Barwana Nahia | 27838 | 0.13 | 0.04 | 0.05 | 0.20 | 3491 |
| Al-Rutba Qadha Center | 32035 | 0.25 | 0.06 | 0.13 | 0.35 | 7858 |
| Al-Walid Nahia | 6221 | 0.09 | 0.04 | 0.01 | 0.18 | 577 |
| Al-Nakhaeb Nahia | 2975 | 0.18 | 0.05 | 0.07 | 0.29 | 539 |
| Al-Kaim Qadha Center | 95636 | 0.22 | 0.05 | 0.11 | 0.32 | 20830 |
| Al-Obour Nahia | 36089 | 0.28 | 0.08 | 0.13 | 0.44 | 10260 |
| Al-Obiadi Nahia | 29511 | 0.08 | 0.04 | 0.01 | 0.16 | 2500 |
| Rawa Qadha Center | 23083 | 0.06 | 0.02 | 0.01 | 0.10 | 1304 |

**TABLE A8: Salahadin**

| Nahiya | Population | Headcount rate | Std. Err. | [95% Confidence Interval] | | Number of poor |
|---|---|---|---|---|---|---|
| Tikrit Qadha Center | 167383 | 0.15 | 0.05 | 15.68 | 0.15 | 24940 |
| Alam Nahia | 52988 | 0.15 | 0.05 | 16.16 | 0.15 | 7911 |
| Tooz-Khormato Qadha Center | 108301 | 0.13 | 0.05 | 14.47 | 0.13 | 13538 |
| Amerly Nahia | 42913 | 0.20 | 0.07 | 13.92 | 0.20 | 8793 |
| Sulaiman Baig Nahia | 24751 | 0.21 | 0.08 | 14.35 | 0.21 | 5091 |
| Samarra Qadha Center | 182139 | 0.14 | 0.05 | 16.43 | 0.14 | 25427 |
| Al-Muotasim Nahia | 16438 | 0.18 | 0.07 | 14.20 | 0.18 | 2919 |
| Dijla Nahia | 16076 | 0.20 | 0.07 | 14.03 | 0.20 | 3199 |
| Balad Qadha Center | 73122 | 0.14 | 0.05 | 16.75 | 0.14 | 10237 |
| Al-Dholoia Nahia | 57863 | 0.18 | 0.06 | 14.09 | 0.18 | 10583 |
| Al-Eshaki Nahia | 41193 | 0.21 | 0.06 | 12.08 | 0.21 | 8457 |
| Yathrib Nahia | 73627 | 0.20 | 0.06 | 13.36 | 0.20 | 14512 |
| Beygee Qadha Center | 170961 | 0.17 | 0.06 | 15.78 | 0.17 | 29354 |
| Al-Ssynia Nahia | 35680 | 0.17 | 0.06 | 16.70 | 0.17 | 5962 |
| Al-Daur Qadha Center | 56181 | 0.09 | 0.04 | 19.36 | 0.09 | 5112 |
| Al-Shirqat Qadha Center | 199567 | 0.18 | 0.06 | 15.29 | 0.18 | 35164 |
| Al-Dijail Qadha Center | 106129 | 0.20 | 0.05 | 14.29 | 0.20 | 21194 |

**TABLE A9: Baghdad**

| Nahiya | Population | Headcount rate | Std. Err. | [95% Confidence Interval] | | Number of poor |
|---|---|---|---|---|---|---|
| Al-Rusafa Qadha Center | 114797 | 0.04 | 0.01 | 0.01 | 0.06 | 4328 |
| Al-Karrada Al-Sharqia Nahia | 311485 | 0.03 | 0.01 | 0.01 | 0.04 | 7818 |
| Baghdad Al-Jedeeda Nahia | 1140276 | 0.11 | 0.02 | 0.07 | 0.15 | 126000 |
| Palestine Nahia | 84777 | 0.00 | 0.00 | 0.00 | 0.01 | 322 |
| Al-Adhamia Qadha Center | 299280 | 0.02 | 0.01 | 0.01 | 0.03 | 6464 |
| Al-Rashdia Nahia | 41847 | 0.16 | 0.02 | 0.11 | 0.21 | 6733 |
| Al-Fahama Nahia | 614606 | 0.12 | 0.02 | 0.08 | 0.16 | 73568 |
| Al-Zohour Nahia | 198287 | 0.24 | 0.04 | 0.17 | 0.31 | 47728 |
| Sader /2 Qadha Center | 39683 | 0.08 | 0.02 | 0.04 | 0.12 | 3060 |
| Abna'a Al-Rafidain Nahia | 140824 | 0.13 | 0.02 | 0.08 | 0.17 | 17913 |
| Al-Mounawara Nahia | 262843 | 0.18 | 0.03 | 0.13 | 0.23 | 48100 |
| Sader /1 Qadha Center | 107069 | 0.11 | 0.02 | 0.07 | 0.15 | 11446 |
| Al-Sideeq Al-Akbar Nahia | 139347 | 0.12 | 0.02 | 0.07 | 0.16 | 16039 |
| Al-Forat Nahia | 295399 | 0.08 | 0.02 | 0.05 | 0.11 | 23868 |
| Al-Karkh Qadha Center | 99483 | 0.02 | 0.01 | 0.01 | 0.03 | 2020 |
| Al-Mansour Nahia | 441714 | 0.02 | 0.01 | 0.01 | 0.04 | 10071 |
| Al-Mamoon Nahia | 856502 | 0.03 | 0.01 | 0.01 | 0.05 | 26295 |
| Al-Kadimiya Qadha Center | 380306 | 0.05 | 0.01 | 0.02 | 0.07 | 18103 |
| That Al Salasil Nahia | 249432 | 0.13 | 0.02 | 0.09 | 0.17 | 31753 |
| Al-Taji Nahia | 157441 | 0.22 | 0.03 | 0.16 | 0.27 | 34149 |
| Mahmudiya Qadha Center | 132673 | 0.11 | 0.02 | 0.07 | 0.14 | 14024 |
| Al-Yousifya Nahia | 128003 | 0.30 | 0.03 | 0.23 | 0.36 | 37914 |

(*continued on next page*)

**TABLE A9: Baghdad** *(continued)*

| Nahiya | Population | Headcount rate | Std. Err. | [95% Confidence Interval] | | Number of poor |
|---|---|---|---|---|---|---|
| Al-Latifya Nahia | 90228 | 0.18 | 0.03 | 0.13 | 0.23 | 16142 |
| Al-Rasheed Nahia | 70755 | 0.18 | 0.03 | 0.13 | 0.23 | 12863 |
| Abu-Gharib Qadha Center | 149233 | 0.17 | 0.03 | 0.12 | 0.22 | 24758 |
| Al-Nasir & Al-Salam Nahia | 150969 | 0.27 | 0.04 | 0.20 | 0.35 | 41335 |
| Al-Tarmiya Qadha Center | 74957 | 0.19 | 0.03 | 0.14 | 0.25 | 14444 |
| Al-Mishahda Nahia | 24696 | 0.49 | 0.05 | 0.39 | 0.60 | 12212 |
| Al-Abiaji Nahia | 13542 | 0.11 | 0.02 | 0.06 | 0.15 | 1430 |
| Al-Mada'in Qadha Center | 60739 | 0.07 | 0.02 | 0.03 | 0.11 | 4300 |
| Al-Jisr Nahia | 154422 | 0.18 | 0.03 | 0.12 | 0.24 | 27286 |
| Al-Wihda Nahia | 217970 | 0.27 | 0.04 | 0.19 | 0.35 | 58634 |

**TABLE A10: Babylon**

| Nahiya | Population | Headcount rate | Std. Err. | [95% Confidence Interval] | | Number of poor |
|---|---|---|---|---|---|---|
| Al-Hilla Qadha Center | 540313 | 0.06 | 0.02 | 0.02 | 0.10 | 34688 |
| Al-Kifl Nahia | 143532 | 0.20 | 0.05 | 0.10 | 0.29 | 28333 |
| Abi Gharaq Nahia | 107182 | 0.12 | 0.03 | 0.05 | 0.19 | 12551 |
| Al-Mahawil Qadha Center | 97792 | 0.09 | 0.03 | 0.03 | 0.15 | 9124 |
| Al-Mashroo Nahia | 107289 | 0.19 | 0.04 | 0.11 | 0.27 | 20771 |
| Al-Emam Nahia | 31725 | 0.11 | 0.04 | 0.04 | 0.19 | 3604 |
| Nile Nahia | 55976 | 0.19 | 0.05 | 0.09 | 0.29 | 10742 |
| Al-Hashimiya Qadha Center | 34816 | 0.08 | 0.03 | 0.01 | 0.15 | 2803 |
| Al-Qasim Nahia | 154236 | 0.16 | 0.04 | 0.07 | 0.25 | 24878 |
| Al-Madhatiya Nahia | 123158 | 0.16 | 0.04 | 0.07 | 0.25 | 19989 |
| Al-Shomaly Nahia | 77233 | 0.21 | 0.05 | 0.11 | 0.30 | 15972 |
| Al-Talea'a Nahia | 39739 | 0.24 | 0.06 | 0.11 | 0.35 | 9430 |
| Al-Mussyab Qadha Center | 51656 | 0.07 | 0.03 | 0.01 | 0.12 | 3497 |
| Saddat Al-Hindin Nahia | 98499 | 0.10 | 0.03 | 0.04 | 0.17 | 10333 |
| Jurf Al-Sakhar Nahia | 40310 | 0.11 | 0.04 | 0.03 | 0.18 | 4249 |
| Al-Iskandaria Nahia | 148019 | 0.10 | 0.03 | 0.03 | 0.17 | 14624 |

**TABLE A11: Kerbala**

| Nahiya | Population | Headcount rate | Std. Err. | [95% Confidence Interval] | | Number of poor |
|---|---|---|---|---|---|---|
| Kerbela Qadha Center | 478879 | 0.12 | 0.03 | 0.07 | 0.17 | 55789 |
| Al-Hassainya Nahia | 138949 | 0.09 | 0.02 | 0.04 | 0.13 | 12005 |
| Al-Hur Nahia | 211975 | 0.20 | 0.04 | 0.13 | 0.27 | 41929 |
| Ain Al-Tamur Qadha Center | 26924 | 0.13 | 0.04 | 0.06 | 0.21 | 3592 |
| Al-Hindiya Qadha Center | 106961 | 0.10 | 0.02 | 0.05 | 0.15 | 10557 |
| Al-Jadwal Al-Ghrabi Nahia | 75029 | 0.18 | 0.04 | 0.11 | 0.25 | 13565 |
| Al-Kharirat Nahia | 50715 | 0.16 | 0.04 | 0.09 | 0.23 | 8099 |

**TABLE A12: Wasit**

| Nahiya | Population | Headcount rate | Std. Err. | [95% Confidence Interval] | | Number of poor |
|---|---|---|---|---|---|---|
| Al-Kut Qadha Center | 407511 | 0.26 | 0.06 | 0.15 | 0.38 | 107746 |
| Wasit Nahia | 39912 | 0.43 | 0.08 | 0.27 | 0.58 | 17050 |
| Shaekh Saad Nahia | 37237 | 0.48 | 0.08 | 0.33 | 0.63 | 17855 |
| Al-Noamaniya Qadha Center | 99503 | 0.18 | 0.05 | 0.08 | 0.28 | 17682 |
| Al-Ahrar Nahia | 45482 | 0.23 | 0.06 | 0.11 | 0.36 | 10661 |
| Al-Hai Qadha Center | 86108 | 0.14 | 0.03 | 0.07 | 0.21 | 12313 |
| Al-Mowafaqiya Nahia | 45903 | 0.32 | 0.05 | 0.22 | 0.43 | 14836 |
| Al-Bashaer Nahia | 36733 | 0.35 | 0.06 | 0.23 | 0.47 | 12930 |
| Badra Qadha Center | 17372 | 0.27 | 0.06 | 0.14 | 0.39 | 4635 |
| Jassan Nahia | 10741 | 0.33 | 0.07 | 0.19 | 0.48 | 3583 |
| Al-Tahab Nahia (Zerbattiya) | 684 | 0.22 | 0.09 | 0.03 | 0.40 | 148 |
| Al-Suwaira Qadha Center | 136628 | 0.14 | 0.04 | 0.07 | 0.22 | 19592 |
| Al-Zubaidiya Nahia | 53975 | 0.16 | 0.04 | 0.08 | 0.25 | 8803 |
| Al-Shehamiya Nahia | 34095 | 0.22 | 0.06 | 0.11 | 0.33 | 7532 |
| Al-Aziziya Qadha Center | 93164 | 0.24 | 0.06 | 0.12 | 0.35 | 22071 |
| Taj-eldeen (AlHafriya) Nahia | 75204 | 0.28 | 0.07 | 0.15 | 0.41 | 21065 |
| Al-Duboni Nahia | 18118 | 0.37 | 0.08 | 0.22 | 0.52 | 6747 |

**TABLE A13: Najaf**

| Nahiya | Population | Headcount rate | Std. Err. | [95% Confidence Interval] | | Number of poor |
|---|---|---|---|---|---|---|
| Al-Najaf Qadha Center | 688448 | 0.06 | 0.02 | 0.03 | 0.09 | 43166 |
| Al-Haydariya Nahia | 45096 | 0.19 | 0.03 | 0.12 | 0.26 | 8699 |
| Al-Shabaka Nahia | 356 | 0.16 | 0.07 | 0.01 | 0.31 | 57 |
| Al-Kufa Qadha Center | 217736 | 0.07 | 0.02 | 0.04 | 0.11 | 16200 |
| Al-Abbassiya Nahia | 84544 | 0.10 | 0.03 | 0.04 | 0.15 | 8125 |
| Al-Huriya Nahia | 29087 | 0.13 | 0.03 | 0.07 | 0.19 | 3912 |
| Al-Manathera Qadha Center | 82451 | 0.13 | 0.03 | 0.08 | 0.18 | 10677 |
| Al-Heera Nahia | 35223 | 0.12 | 0.03 | 0.06 | 0.18 | 4114 |
| Al-Mishkhab Nahia | 83299 | 0.12 | 0.03 | 0.07 | 0.17 | 9879 |
| Al-Qadisiya Nahia | 47066 | 0.21 | 0.04 | 0.12 | 0.28 | 9766 |

**TABLE A14: Qadisiya**

| Nahiya | Population | Headcount rate | Std. Err. | [95% Confidence Interval] | | Number of poor |
|---|---|---|---|---|---|---|
| Al-Diwaniya Qadha Center | 388415 | 0.27 | 0.04 | 0.20 | 0.35 | 105998 |
| Al-Saniya Nahia | 44312 | 0.36 | 0.05 | 0.25 | 0.46 | 15775 |
| Al-Shafeia Nahia | 44034 | 0.35 | 0.05 | 0.25 | 0.44 | 15227 |
| Al-Daghara Nahia | 58930 | 0.44 | 0.06 | 0.33 | 0.55 | 26023 |
| Afaq Qadha Center | 52169 | 0.56 | 0.05 | 0.45 | 0.66 | 29136 |
| Nafar Nahia | 19527 | 0.44 | 0.06 | 0.32 | 0.56 | 8584 |
| Al-Badair Nahia | 60219 | 0.65 | 0.05 | 0.54 | 0.75 | 38974 |
| Sumer Nahia | 32587 | 0.34 | 0.06 | 0.22 | 0.45 | 10936 |
| Al-Shamiya Qadha Center | 94112 | 0.51 | 0.05 | 0.42 | 0.60 | 48176 |
| Gammas Nahia | 87526 | 0.77 | 0.04 | 0.68 | 0.83 | 67351 |
| Al-Mihanawiya Nahia | 42255 | 0.45 | 0.06 | 0.34 | 0.57 | 19222 |
| Al-Salahiya Nahia | 31130 | 0.61 | 0.06 | 0.48 | 0.73 | 18834 |
| Al-Hamza Qadha Center | 112885 | 0.56 | 0.05 | 0.46 | 0.67 | 63385 |
| Al-Sadeer Nahia | 40584 | 0.57 | 0.05 | 0.47 | 0.67 | 23222 |
| Al-Shinafiya Nahia | 49401 | 0.57 | 0.06 | 0.45 | 0.68 | 28109 |

**TABLE A15: Muthanna**

| Nahiya | Population | Headcount rate | Std. Err. | [95% Confidence Interval] | | Number of poor |
|---|---|---|---|---|---|---|
| Al-Samawa Qadha Center | 271285 | 0.41 | 0.10 | 0.19 | 0.62 | 111254 |
| Al-Sowair Nahia | 39066 | 0.70 | 0.09 | 0.51 | 0.87 | 27428 |
| Al-Rumaitha Qadha Center | 118423 | 0.49 | 0.12 | 0.23 | 0.74 | 57909 |
| Al-Majd Nahia | 37727 | 0.66 | 0.09 | 0.46 | 0.84 | 24855 |
| Al-Warka Nahia | 93216 | 0.71 | 0.09 | 0.52 | 0.88 | 65988 |
| Al-Najmi Nahia | 32461 | 0.72 | 0.08 | 0.54 | 0.88 | 23453 |
| Al-Hilal Nahia | 31800 | 0.73 | 0.08 | 0.55 | 0.88 | 23255 |
| Al-Salman Qadha Center | 7818 | 0.58 | 0.12 | 0.34 | 0.80 | 4506 |
| Al-Bussaiya Nahia | 927 | 0.57 | 0.12 | 0.32 | 0.80 | 527 |
| Al-Khdhir Qadha Center | 77965 | 0.58 | 0.11 | 0.35 | 0.79 | 44908 |
| Al-Daraji Nahia | 18258 | 0.70 | 0.09 | 0.51 | 0.86 | 12740 |

**TABLE A16: Thi Qar**

| Nahiya | Population | Headcount rate | Std. Err. | [95% Confidence Interval] | | Number of poor |
|---|---|---|---|---|---|---|
| Al-Nasiriya Qadha Center | 498661 | 0.23 | 0.04 | 0.14 | 0.32 | 115141 |
| Al-Islah Nahia | 40695 | 0.37 | 0.06 | 0.25 | 0.49 | 15110 |
| Al-Battha'a Nahia | 40259 | 0.35 | 0.06 | 0.23 | 0.48 | 14252 |
| Said Dekhil Nahia | 55881 | 0.63 | 0.05 | 0.53 | 0.72 | 35172 |
| Ur Nahia | 58637 | 0.41 | 0.07 | 0.27 | 0.54 | 23848 |
| Al-Rifaai Qadha Center | 130791 | 0.38 | 0.06 | 0.27 | 0.49 | 49596 |
| Qalat Siker Nahia | 100416 | 0.46 | 0.06 | 0.34 | 0.58 | 46623 |
| Al-Nasr Nahia | 84910 | 0.37 | 0.06 | 0.25 | 0.48 | 31289 |
| Al-Fajer Nahia | 55939 | 0.46 | 0.06 | 0.34 | 0.58 | 25877 |
| Suq AL-Shoyolh Qadha Center | 117837 | 0.32 | 0.06 | 0.21 | 0.43 | 37684 |
| Akaika Nahia | 45459 | 0.49 | 0.07 | 0.35 | 0.62 | 22061 |
| Garmat Beni Said Nahia | 57436 | 0.42 | 0.07 | 0.29 | 0.55 | 24066 |
| Al-Fadhliya Nahia | 53086 | 0.33 | 0.06 | 0.20 | 0.45 | 17370 |
| Al-Ttar Nahia | 18161 | 0.49 | 0.08 | 0.33 | 0.64 | 8830 |
| Al-Chibayish Qadha Center | 41831 | 0.53 | 0.06 | 0.41 | 0.64 | 22175 |
| Al-Hammer Nahia | 8521 | 0.55 | 0.06 | 0.43 | 0.67 | 4726 |
| Al-Fhood Nahia | 44075 | 0.48 | 0.06 | 0.35 | 0.61 | 21182 |
| Al-Shattra Qadha Center | 227380 | 0.37 | 0.06 | 0.25 | 0.49 | 84631 |
| Al-Dawaya Nahia | 77893 | 0.62 | 0.05 | 0.51 | 0.71 | 48216 |
| Al-Gharraf Nahia | 111957 | 0.48 | 0.07 | 0.34 | 0.62 | 54064 |

**TABLE A17: Missan**

| Qhada | Population | Headcount rate | Std. Err. | [95% Confidence Interval] | | Number of poor |
|---|---|---|---|---|---|---|
| Al-Amara Qadha Center | 529251 | 0.25 | 0.08 | 0.09 | 0.41 | 131625 |
| Kumait Nahia | 26709 | 0.44 | 0.10 | 0.23 | 0.64 | 11755 |
| Ali Al-Garbi Qadha Center | 31250 | 0.30 | 0.10 | 0.11 | 0.50 | 9481 |
| Ali Al-Sharqi Nahia | 17859 | 0.21 | 0.09 | 0.02 | 0.40 | 3727 |
| Al-Maimouna Qadha Center | 52379 | 0.48 | 0.07 | 0.33 | 0.62 | 24896 |
| Al-Salam Nahia | 35140 | 0.66 | 0.06 | 0.54 | 0.76 | 23217 |
| Said Ahmed Al-Rifaai Nahia | 10450 | 0.67 | 0.08 | 0.50 | 0.82 | 6968 |
| Qalat Saleh Qadha Center | 53955 | 0.68 | 0.06 | 0.55 | 0.77 | 36808 |
| Al-Ezair Nahia | 29933 | 0.70 | 0.05 | 0.58 | 0.79 | 20875 |
| Al-Mejar Al-Kabir Qadha Center | 84476 | 0.38 | 0.07 | 0.24 | 0.52 | 32067 |
| Al-Adel Nahia | 15243 | 0.25 | 0.08 | 0.10 | 0.40 | 3838 |
| Al-Khayr Nahia | 19585 | 0.64 | 0.07 | 0.49 | 0.76 | 12446 |
| Al-Kahla'a Qadha Center | 37435 | 0.44 | 0.07 | 0.30 | 0.58 | 16412 |
| Al-Mshsrsh Nahia | 30369 | 0.47 | 0.07 | 0.33 | 0.60 | 14176 |
| Bani Hashim Nahia | 20003 | 0.72 | 0.06 | 0.60 | 0.83 | 14498 |

**TABLE A18: Basrah**

| Nahiya | Population | Headcount rate | Std. Err. | [95% Confidence Interval] | | Number of poor |
|---|---|---|---|---|---|---|
| Al-Basrah Qadha Center | 1172742 | 0.10 | 0.02 | 0.06 | 0.13 | 111880 |
| Al-Hartha Nahia | 140123 | 0.12 | 0.02 | 0.07 | 0.16 | 16633 |
| Abu Al-Khaseeb Qadha Center | 190855 | 0.14 | 0.02 | 0.09 | 0.18 | 25842 |
| Al-Zubair Qadha Center | 353932 | 0.18 | 0.02 | 0.14 | 0.23 | 65088 |
| Safwan Nahia | 36065 | 0.18 | 0.03 | 0.12 | 0.24 | 6470 |
| Um Qasr Nahia | 51314 | 0.05 | 0.02 | 0.02 | 0.09 | 2776 |
| Al-Qurna Qadha Center | 119267 | 0.15 | 0.03 | 0.10 | 0.20 | 18331 |
| Al-Dair Nahia | 90761 | 0.26 | 0.03 | 0.19 | 0.32 | 23416 |
| Al-Thagar Nahia | 35542 | 0.28 | 0.05 | 0.19 | 0.37 | 10126 |
| Al-Faw Qadha Center | 34766 | 0.09 | 0.02 | 0.04 | 0.13 | 2979 |
| Shat Al-Arab Qadha Center | 123049 | 0.11 | 0.02 | 0.07 | 0.16 | 14089 |
| Al-Nashwa Nahia | 29167 | 0.25 | 0.04 | 0.17 | 0.33 | 7265 |
| Al-Midaina Qadha Center | 68677 | 0.15 | 0.03 | 0.10 | 0.20 | 10192 |
| Iz-Eldeen Salim Nahia | 60926 | 0.17 | 0.03 | 0.10 | 0.23 | 10236 |
| Talha (Al-Sadiq) Nahia | 66836 | 0.11 | 0.03 | 0.06 | 0.17 | 7673 |

## Appendix B: GLS Models

| Duhok | Coefficient | Std. Err. | t | \|Prob\|>t |
|---|---|---|---|---|
| Intercept | 5.4114 | 0.0402 | 134.6406 | 0 |
| Dummy variable for ownership of air conditioner | 0.1433 | 0.0247 | 5.8052 | 0 |
| Dummy variable for age 30–39 | 0.0624 | 0.0263 | 2.3736 | 0.0178 |
| Dummy variable for age 50–59 | –0.0784 | 0.03 | –2.6111 | 0.0091 |
| Number of children between ages 7 and 17 | –0.1061 | 0.0087 | –12.1801 | 0 |
| Dependency ratio | –0.2417 | 0.0892 | –2.7079 | 0.0069 |
| Dummy variable for primary level complete | 0.0599 | 0.0267 | 2.2462 | 0.0249 |
| Dummy variable for secondary level incomplete or complete | 0.1985 | 0.0761 | 2.6095 | 0.0092 |
| Dummy variable for institute level complete | 0.151 | 0.0479 | 3.1534 | 0.0017 |
| Dummy variable for graduate/technical level or post graduate level complete | 0.2389 | 0.0479 | 4.992 | 0 |
| Number of household members aged 60 or above | –0.1614 | 0.0286 | –5.6445 | 0 |
| Proportion of household members between ages 0 and 6 | –0.5535 | 0.1056 | –5.2395 | 0 |
| Proportion of household members aged 60 or above | 0.5871 | 0.1612 | 3.6428 | 0.0003 |
| Dummy variable for ownership of vacuum cleaner | 0.0884 | 0.0236 | 3.7547 | 0.0002 |

| Nainawa | Coefficient | Std. Err. | t | \|Prob\|>t |
|---|---|---|---|---|
| Intercept | 4.481 | 0.1137 | 39.4164 | 0 |
| Dummy variable for age 20–29 | 0.1584 | 0.0364 | 4.3477 | 0 |
| Car ownership rate in nahiya | 0.9682 | 0.2374 | 4.0785 | 0 |
| Dependency ratio | –0.6164 | 0.05 | –12.3298 | 0 |
| Proportion of household heads with secondary level incomplete or complete in nahiya | –2.8675 | 0.827 | –3.4673 | 0.0005 |
| Dummy variable for institute level complete | 0.3067 | 0.0433 | 7.0791 | 0 |
| Dummy variable for graduate/technical level or post graduate level complete | 0.4704 | 0.0402 | 11.7007 | 0 |
| Dummy variable for male | –0.1125 | 0.0372 | –3.0269 | 0.0025 |
| Dummy variable for maximum education in the household is intermediate level incomplete or complete | –0.0703 | 0.0241 | –2.9107 | 0.0037 |
| Dummy variable for employment in government/public sector | 0.0945 | 0.0233 | 4.0542 | 0.0001 |
| Proportion of household members aged 60 or above | 0.4306 | 0.1053 | 4.0877 | 0 |
| Share of working age males employed | 0.1632 | 0.0282 | 5.7844 | 0 |
| Proportion of households with vacuum in nahiya | 0.7021 | 0.2194 | 3.1999 | 0.0014 |
| Dummy variable for brick wall | 0.202 | 0.0651 | 3.1056 | 0.0019 |
| Interaction term for rural area and dummy variable for age of household head 40–49 | –0.1254 | 0.0307 | –4.0851 | 0 |
| Interaction term for urban area and dummy variable for age of household head 70 or more | 0.1986 | 0.062 | 3.2043 | 0.0014 |
| Interaction term for urban area and dummy variable for intermediate level incomplete or complete | –0.1578 | 0.034 | –4.6363 | 0 |
| Interaction term for urban area and dummy variable for secondary level incomplete or complete | 0.223 | 0.051 | 4.3697 | 0 |
| Interaction term for urban area and dummy variable for maximum education in the household is institute level complete | 0.1128 | 0.0368 | 3.0635 | 0.0022 |

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| **Nainawa** | **Coefficient** | **Std. Err.** | **t** | **\|Prob\|>t** |
|---|---|---|---|---|
| Interaction term for rural area and dummy variable for maximum education in the household is graduate/technical level or post graduate level complete | –0.3075 | 0.0546 | –5.6369 | 0 |
| Interaction term for urban area and dummy variable for principal material of wall is cement block, concrete readymade, or precast | –0.175 | 0.0303 | –5.7833 | 0 |
| Interaction term for rural area and main source of drinking water is public network | –0.1054 | 0.0345 | –3.0542 | 0.0023 |

| Erbil | Coefficient | Std. Err. | t | \|Prob\|>t |
|---|---|---|---|---|
| Intercept | 5.2698 | 0.0528 | 99.761 | 0 |
| Dummy variable for ownership of air conditioner | 0.2025 | 0.0198 | 10.229 | 0 |
| Dummy variable for household head's age 60–69 | –0.1976 | 0.0347 | –5.6931 | 0 |
| Dummy variable for household head's age 70 or more | –0.1776 | 0.0485 | –3.6658 | 0.0003 |
| Number of children between ages 0 and 6 | –0.1448 | 0.0089 | –16.2091 | 0 |
| Number of children between ages 7 and 17 | –0.1134 | 0.0061 | –18.6343 | 0 |
| Access of electricity from private generator (days per week) | 0.0226 | 0.0081 | 2.7962 | 0.0052 |
| Dummy variable for household head has no education | –0.0886 | 0.0208 | –4.2684 | 0 |
| Dummy variable for household head's education is institute level complete | 0.1372 | 0.0329 | 4.1712 | 0 |
| Dummy variable for household head's education is graduate/technical level or post graduate level complete | 0.1691 | 0.035 | 4.8348 | 0 |
| Number of males employed | –0.0796 | 0.0258 | –3.0803 | 0.0021 |
| Dummy variable for ownership of freezer | 0.0512 | 0.019 | 2.6969 | 0.0071 |
| Dummy variable for dwelling owned by household | 0.0779 | 0.0207 | 3.7683 | 0.0002 |
| Dummy variable for male | –0.1134 | 0.0275 | –4.1189 | 0 |
| Proportion of household members aged 60 or above | 0.5115 | 0.068 | 7.5191 | 0 |
| Dummy variable for principal material of wall is brick | 0.1217 | 0.0308 | 3.9504 | 0.0001 |
| Dummy variable for ownership of washing machine | 0.1047 | 0.0301 | 3.482 | 0.0005 |

| Sulaimaniya | Coefficient | Std. Err. | t | \|Prob\|>t |
|---|---|---|---|---|
| Intercept | 6.1924 | 0.0524 | 118.0758 | 0 |
| Dummy variable for ownership of air conditioner | 0.1231 | 0.0136 | 9.029 | 0 |
| Dummy variable for household head's age 40–49 | 0.065 | 0.0146 | 4.4488 | 0 |
| Dummy variable for household head's age 70 or more | –0.1832 | 0.0193 | –9.5032 | 0 |
| Dummy variable for household head has no education | –0.077 | 0.0136 | –5.6396 | 0 |
| Number of males employed = 0 | –0.1912 | 0.0322 | –5.9331 | 0 |
| Number of males employed = 2 | 0.0646 | 0.0188 | 3.4324 | 0.0006 |
| Number of males employed = 3 | 0.104 | 0.0312 | 3.3331 | 0.0009 |
| Dummy variable for ownership of freezer | 0.1654 | 0.0133 | 12.4547 | 0 |
| Household size | –0.276 | 0.0107 | –25.8669 | 0 |
| Square of the household size | 0.0132 | 0.0007 | 17.6451 | 0 |
| Dummy variable for maximum education in the household is primary level complete | 0.0957 | 0.0212 | 4.5099 | 0 |
| Dummy variable for maximum education in the household is intermediate level incomplete or complete | 0.1586 | 0.0237 | 6.6977 | 0 |
| Dummy variable for maximum education in the household is secondary level incomplete or complete | 0.1035 | 0.0234 | 4.4222 | 0 |
| Dummy variable for maximum education in the household is institute level complete | 0.136 | 0.026 | 5.2415 | 0 |
| Dummy variable for maximum education in the household is graduate/technical level or post graduate level complete | 0.1841 | 0.0252 | 7.3185 | 0 |
| Dummy variable for source of electricity is private generator | 0.1207 | 0.0194 | 6.225 | 0 |
| Proportion of household members between ages 0 and 6 | –0.2624 | 0.0449 | –5.8484 | 0 |

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| **Sulaimaniya** | **Coefficient** | **Std. Err.** | **t** | **\|Prob\|>t** |
|---|---|---|---|---|
| Proportion of household members between ages 7 and 17 | –0.3918 | 0.0415 | –9.4479 | 0 |
| Share of working age males employed | –0.1511 | 0.0318 | –4.7537 | 0 |
| Dummy variable for ownership of vacuum cleaner | 0.1446 | 0.0193 | 7.4855 | 0 |
| Dummy variable for principal material of wall is cement block, concrete readymade, or precast | 0.0478 | 0.0155 | 3.0842 | 0.0021 |

| Diyala | Coefficient | Std. Err. | t | \|Prob\|>t |
|---|---|---|---|---|
| Intercept | 5.5157 | 0.0646 | 85.3229 | 0 |
| Dummy variable for ownership of air conditioner | 0.1232 | 0.026 | 4.7361 | 0 |
| Number of children between ages 0 and 6 | –0.0325 | 0.0108 | –3.017 | 0.0026 |
| Access of electricity from shared generator is five days per week | 0.392 | 0.131 | 2.9914 | 0.0028 |
| Dependency ratio | –0.1926 | 0.0539 | –3.5721 | 0.0004 |
| Dummy variable for household head's education is primary level incomplete | 0.093 | 0.0338 | 2.7564 | 0.0059 |
| Dummy variable for ownership of freezer | 0.085 | 0.0224 | 3.7902 | 0.0002 |
| Dummy variable for ownership of fridge | 0.0859 | 0.0381 | 2.2573 | 0.0242 |
| Dummy variable for ownership of generator | 0.1577 | 0.0204 | 7.715 | 0 |
| Household size | –0.2123 | 0.0126 | –16.8536 | 0 |
| Square of household size | 0.0089 | 0.0008 | 11.2718 | 0 |
| Dummy variable for maximum education in the household is graduate/technical level or post graduate level complete | 0.0744 | 0.0274 | 2.715 | 0.0067 |
| Dummy variable for ownership of vacuum cleaner | 0.0792 | 0.0268 | 2.9509 | 0.0032 |
| Dummy variable for principal material of wall is brick | 0.0852 | 0.0222 | 3.8317 | 0.0001 |

| Kirkuk | Coefficient | Std. Err. | t | \|Prob\|>t |
|---|---|---|---|---|
| Intercept | 4.5162 | 0.0534 | 84.5791 | 0 |
| Dummy variable for ownership of air conditioner | 0.1566 | 0.0264 | 5.942 | 0 |
| Dummy variable for household head's age 20–29 | 0.1218 | 0.049 | 2.4832 | 0.0132 |
| Dummy variable for household head's age 30–39 | 0.0721 | 0.03 | 2.4051 | 0.0164 |
| Number of children between ages 7 and 17 = 0 | 0.4608 | 0.0409 | 11.2771 | 0 |
| Number of children between ages 7 and 17 = 1 | 0.3 | 0.0373 | 8.0458 | 0 |
| Number of children between ages 7 and 17 = 5 | –0.1679 | 0.0735 | –2.2846 | 0.0226 |
| Number of children between ages 7 and 17 = 6 | –0.2162 | 0.0969 | –2.2308 | 0.026 |
| Dependency ratio | 0.3195 | 0.0912 | 3.504 | 0.0005 |
| Number of household members aged 60 or above | –0.2209 | 0.0226 | –9.7625 | 0 |
| Dummy variable for dwelling owned by government/public sector | –0.2496 | 0.0367 | –6.7916 | 0 |
| Dummy variable for male | 0.2447 | 0.0364 | 6.7207 | 0 |
| Dummy variable for maximum education in the household is intermediate level incomplete or complete | –0.0429 | 0.0294 | –1.46 | 0.1447 |
| Dummy variable for maximum education in the household is institute level complete | 0.1868 | 0.0401 | 4.6583 | 0 |
| Dummy variable for employment in private sector | –0.0835 | 0.0231 | –3.6068 | 0.0003 |
| Proportion of household members between ages 0 and 6 | –1.1376 | 0.1128 | –10.0887 | 0 |
| Proportion of household members aged 60 or above | 0.6371 | 0.1194 | 5.3334 | 0 |
| Dummy variable for ownership of vacuum cleaner | 0.0738 | 0.0282 | 2.6228 | 0.0089 |
| Dummy variable for principal material of wall is clay, bamboo, or other | –0.2311 | 0.0332 | –6.9655 | 0 |
| Dummy variable for ownership of washing machine | 0.1607 | 0.0314 | 5.1105 | 0 |

| Anbar | Coefficient | Std. Err. | t | \|Prob\|>t |
|---|---|---|---|---|
| Intercept | 9.5194 | 1.5028 | 6.3343 | 0 |
| Dummy variable for ownership of air conditioner | 0.1103 | 0.0182 | 6.0541 | 0 |
| Dummy variable for household head's age 30–39 | 0.0631 | 0.0181 | 3.4807 | 0.0005 |
| Dummy variable for household head's age 70 or more | 0.2148 | 0.0316 | 6.7944 | 0 |
| Access of electricity from private generator (days per week) | 0.0207 | 0.0027 | 7.7264 | 0 |
| Dummy variable for household head's education is primary level incomplete | –0.0522 | 0.0172 | –3.0391 | 0.0024 |
| Dummy variable for household head's education is graduate/technical level or post graduate level complete | 0.0749 | 0.0263 | 2.8447 | 0.0045 |
| Number of household members aged 60 or above | –0.2119 | 0.0201 | –10.5485 | 0 |
| Dummy variable for maximum education in the household is secondary level incomplete or complete | –0.0593 | 0.015 | –3.9463 | 0.0001 |
| Proportion of household heads employed in the private sector in nahiya | –0.5733 | 0.1907 | –3.0064 | 0.0027 |
| Proportion of household members aged 60 or above | 1.654 | 0.2006 | 8.2434 | 0 |
| Proportion of households with television in nahiya | –4.9148 | 1.508 | –3.2592 | 0.0011 |
| Dummy variable for ownership of vacuum cleaner | 0.1586 | 0.0206 | 7.6987 | 0 |
| Dummy variable for ownership of washing machine | 0.1902 | 0.0154 | 12.3597 | 0 |
| Interaction of rural area and proportion of household members between ages 0 and 6 | –0.1414 | 0.0585 | –2.4175 | 0.0157 |
| Interaction of urban area and proportion of household members between ages 0 and 6 | –0.4129 | 0.0632 | –6.532 | 0 |
| Interaction of rural area and dummy variable for household head's age 20–29 | 0.2208 | 0.048 | 4.5993 | 0 |
| Interaction of rural area and dummy variable for ownership of cooler | –0.2111 | 0.0695 | –3.037 | 0.0024 |

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| Anbar | Coefficient | Std. Err. | t | \|Prob\|>t |
|---|---|---|---|---|
| Interaction of urban area and dummy variable for household head has no education | –0.1797 | 0.0298 | –6.0261 | 0 |
| Interaction of urban area and dummy variable for household head's education is primary level complete | 0.0535 | 0.0202 | 2.6449 | 0.0082 |
| Interaction for rural area and no ownership of freezer | –0.1112 | 0.0199 | –5.5849 | 0 |
| Interaction of rural area and household head is unmarried | –0.1788 | 0.0388 | –4.6122 | 0 |
| Interaction of rural area and dummy variable for maximum education in the household is no education | –0.4597 | 0.0913 | –5.0346 | 0 |
| Interaction of rural area and no ownership of water heater | 0.1421 | 0.041 | 3.4651 | 0.0005 |

| Salahaddin | Coefficient | Std. Err. | t | \|Prob\|>t |
|---|---|---|---|---|
| Intercept | 4.7414 | 0.0576 | 82.3636 | 0 |
| Dummy variable for ownership of car | 0.1498 | 0.0211 | 7.108 | 0 |
| Number of children between ages 7 and 17 | –0.1367 | 0.01 | –13.7257 | 0 |
| Dummy variable for household head's education is intermediate level incomplete or complete | 0.0704 | 0.0313 | 2.2487 | 0.0247 |
| Dummy variable for household head's education is institute level complete | 0.0786 | 0.0344 | 2.2858 | 0.0224 |
| Dummy variable for household head's education is graduate/technical level or post graduate level complete | 0.2015 | 0.0307 | 6.571 | 0 |
| Number of household members aged 60 or above | –0.1876 | 0.026 | –7.2277 | 0 |
| Dummy variable for ownership of freezer | 0.0935 | 0.0234 | 3.9894 | 0.0001 |
| Dummy variable for ownership of generator | 0.0595 | 0.0284 | 2.0952 | 0.0363 |
| Dummy variable for married | –0.0973 | 0.0362 | –2.6862 | 0.0073 |
| Dummy variable for source of electricity is private generator | 0.1026 | 0.0294 | 3.4835 | 0.0005 |
| Dummy variable for public sewage network | 0.0773 | 0.0286 | 2.7 | 0.007 |
| Proportion of household members between ages 7 and 17 | 0.593 | 0.091 | 6.517 | 0 |
| Dummy variable for source of electricity is shared generator | 0.1428 | 0.0311 | 4.5974 | 0 |
| Proportion of household members aged 60 or above | 1.1427 | 0.1188 | 9.6224 | 0 |
| Dummy variable for ownership of vacuum cleaner | 0.167 | 0.0265 | 6.3022 | 0 |
| Dummy variable for principal material of wall is clay, bamboo, or other | –0.1606 | 0.0332 | –4.8437 | 0 |
| Dummy variable for main source of drinking water is public network | –0.1386 | 0.0361 | –3.8377 | 0.0001 |
| Dummy variable for ownership of water heater | 0.0911 | 0.0344 | 2.6491 | 0.0081 |

| Baghdad | Coefficient | Std. Err. | t | \|Prob\|>t |
|---|---|---|---|---|
| Intercept | 5.1627 | 0.1438 | 35.8925 | 0 |
| Dummy variable for household head's age 20–29 | 0.2228 | 0.0368 | 6.0605 | 0 |
| Dummy variable for household head's age 40–49 | –0.0806 | 0.0202 | –3.9872 | 0.0001 |
| Access of electricity from shared generator (days per week) | 0.0209 | 0.0053 | 3.9125 | 0.0001 |
| Dummy variable for household head has no education | –0.0878 | 0.0271 | –3.2369 | 0.0012 |
| Proportion of household heads with primary level incomplete in nahiya | –0.5831 | 0.1813 | –3.2153 | 0.0013 |
| Dummy variable for household head's education is secondary level incomplete or complete | 0.1531 | 0.0285 | 5.3672 | 0 |
| Dummy variable for household head's education is institute level complete | 0.1411 | 0.0419 | 3.367 | 0.0008 |
| Dummy variable for household head's education is graduate/technical level or post graduate level complete | 0.1943 | 0.0357 | 5.4473 | 0 |
| Dummy variable for ownership of generator | 0.1773 | 0.0194 | 9.1257 | 0 |
| Proportion of households with generator in nahiya | –0.2233 | 0.0723 | –3.0866 | 0.0021 |
| Average household size in nahiya | –0.0786 | 0.0194 | –4.0643 | 0 |
| Dummy variable for maximum education in the household is no education | 0.132 | 0.0596 | 2.215 | 0.0269 |
| Dummy variable for maximum education in the household is institute level complete | 0.0861 | 0.0355 | 2.4289 | 0.0152 |
| Dummy variable for maximum education in the household is graduate/technical level or post graduate level complete | 0.115 | 0.028 | 4.0986 | 0 |
| Average distance to the nearest road in nahiya | –0.0228 | 0.0041 | –5.6366 | 0 |
| Average distance to the nearest school in nahiya | 0.0146 | 0.0047 | 3.126 | 0.0018 |
| Average distance to the nearest school in qhada | 0.0206 | 0.0068 | 3.0515 | 0.0023 |
| Dummy variable for household head is unemployed | –0.0816 | 0.0213 | –3.8406 | 0.0001 |
| Dummy variable for public sewage network | 0.0582 | 0.0266 | 2.1868 | 0.0289 |
| Dummy variable for closed drain, open drain, or other | –0.099 | 0.0426 | –2.3211 | 0.0204 |

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| **Baghdad** | **Coefficient** | **Std. Err.** | **t** | **\|Prob\|>t** |
|---|---|---|---|---|
| Proportion of household members between ages 0 and 6 | –0.5569 | 0.0513 | –10.8565 | 0 |
| Proportion of household members aged 60 or above | 0.7274 | 0.0523 | 13.9089 | 0 |
| Dummy variable for principal material of wall is cement block, concrete readymade, or precast | –0.0945 | 0.0294 | –3.2141 | 0.0013 |

| Babylon | Coefficient | Std. Err. | t | \|Prob\|>t |
|---|---|---|---|---|
| Intercept | 4.9265 | 0.0485 | 101.5122 | 0 |
| Dummy variable for ownership of air conditioner | 0.1228 | 0.0284 | 4.3241 | 0 |
| Dummy variable for household head's age 20–29 | 0.1555 | 0.0476 | 3.2661 | 0.0011 |
| Dummy variable for household head's age 40–49 | 0.1152 | 0.0262 | 4.3909 | 0 |
| Dummy variable for ownership of car | 0.185 | 0.0262 | 7.0752 | 0 |
| Number of children between ages 7 and 17 | –0.1277 | 0.0116 | –10.9606 | 0 |
| Dummy variable for household head has no education | –0.1235 | 0.0321 | –3.8471 | 0.0001 |
| Dummy variable for household head's education is institute level complete | 0.1269 | 0.0411 | 3.0867 | 0.0021 |
| Dummy variable for household head's education is graduate/technical level or post graduate level complete | 0.1962 | 0.0459 | 4.2711 | 0 |
| Dummy variable for housing unit is clay house, bamboo house, or other | –0.2327 | 0.0997 | –2.3331 | 0.0199 |
| Dummy variable for maximum education in the household is no education | 0.2641 | 0.0844 | 3.1305 | 0.0018 |
| Dummy variable for maximum education in the household is graduate/technical level or post graduate level complete | –0.0761 | 0.0346 | –2.1962 | 0.0284 |
| Proportion of household members between ages 0 and 6 | –0.6639 | 0.0776 | –8.5525 | 0 |
| Proportion of household members between ages 7 and 17 | 0.2961 | 0.1133 | 2.6143 | 0.0091 |
| Proportion of household members aged 60 or above | 0.4701 | 0.0879 | 5.3462 | 0 |
| Dummy variable for ownership of vacuum cleaner | 0.1376 | 0.0314 | 4.3861 | 0 |
| Dummy variable for ownership of washing machine | 0.1081 | 0.0274 | 3.9384 | 0.0001 |

| Kerbala | Coefficient | Std. Err. | t | \|Prob\|>t |
|---|---|---|---|---|
| Intercept | 5.6676 | 0.0662 | 85.5919 | 0 |
| Dummy variable for household head's age 40–49 | –0.0627 | 0.0201 | –3.1227 | 0.0019 |
| Dummy variable for ownership of car | 0.2661 | 0.0199 | 13.3632 | 0 |
| DAYS_SHARED_GENERATOR_6 Days | 0.4051 | 0.1575 | 2.5721 | 0.0104 |
| Dummy variable for household head's education is graduate/technical level or post graduate level complete | 0.0717 | 0.0591 | 1.2141 | 0.2252 |
| Number of employed male = 3 | 0.1136 | 0.0289 | 3.9327 | 0.0001 |
| Number of employed = 5 | –0.2476 | 0.0376 | –6.5855 | 0 |
| Dummy variable for ownership of freezer | 0.1112 | 0.0177 | 6.269 | 0 |
| Household size | –0.1925 | 0.0082 | –23.3487 | 0 |
| Square of household size | 0.0069 | 0.0003 | 20.5117 | 0 |
| Dummy variable for maximum education in the household is graduate/technical level or post graduate level complete | 0.2979 | 0.0346 | 8.6188 | 0 |
| Dummy variable for public sewage network | 0.1022 | 0.0217 | 4.7115 | 0 |
| Proportion of household members between ages 7 and 17 | –0.1373 | 0.0486 | –2.8237 | 0.0049 |
| Dummy variable for ownership of vacuum cleaner | 0.075 | 0.02 | 3.7413 | 0.0002 |
| Dummy variable for principal material of wall is brick | 0.1056 | 0.0176 | 5.9929 | 0 |
| Dummy variable for ownership of washing machine | 0.0976 | 0.02 | 4.8741 | 0 |
| Dummy variable for main source of drinking water is public network | –0.1681 | 0.0372 | –4.5153 | 0 |
| Interaction of urban area and proportion of household members between ages 0 and 6 | –0.3987 | 0.0654 | –6.0936 | 0 |
| Interaction of urban area and dummy variable for born outside the governorate | 0.0838 | 0.0222 | 3.7738 | 0.0002 |
| Interaction of rural area and dummy variable for household head has no education | 0.1982 | 0.0287 | 6.8934 | 0 |

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| **Kerbala** | **Coefficient** | **Std. Err.** | **t** | **\|Prob\|>t** |
|---|---|---|---|---|
| Interaction of urban area and dummy variable for household head's education is primary level incomplete | –0.118 | 0.0277 | –4.2607 | 0 |
| Interaction of rural area and dummy variable for household head's education is graduate/technical level or post graduate level complete | –0.4603 | 0.0828 | –5.5616 | 0 |
| Interaction for rural area and number of employed males = 2 | 0.1744 | 0.032 | 5.4438 | 0 |
| Interaction of rural area and no fridge ownership | –0.0994 | 0.0313 | –3.1785 | 0.0016 |
| Interaction of urban area and dummy variable for dwelling owned by government/public sector | –0.2024 | 0.037 | –5.4674 | 0 |
| Interaction for rural area and dummy variable for not married | –0.1223 | 0.044 | –2.7778 | 0.0057 |
| Interaction for urban area and dummy variable for maximum education in the household is institute level complete | 0.2218 | 0.0381 | 5.8234 | 0 |
| Interaction for urban area and dummy variable for maximum education in the household is graduate/technical level or post graduate level complete | –0.2663 | 0.042 | –6.3386 | 0 |
| Interaction of rural area and dummy variable for no public sewage network | –0.0525 | 0.0262 | –2.0015 | 0.0458 |
| Interaction of urban area and dummy variable for no public sewage network | –0.1196 | 0.0848 | –1.4103 | 0.159 |

| Wasit | Coefficient | Std. Err. | t | \|Prob\|>t |
|---|---|---|---|---|
| Intercept | 4.5919 | 0.1104 | 41.5748 | 0 |
| Dummy variable for household head's age 50–59 | –0.1174 | 0.0339 | –3.4694 | 0.0005 |
| Dummy variable for household head's age 60–69 | –0.167 | 0.04 | –4.1721 | 0 |
| Dummy variable for household head's age 70 or more | –0.1655 | 0.057 | –2.9043 | 0.0037 |
| Dummy variable for ownership of car | 0.1661 | 0.0271 | 6.1309 | 0 |
| Dependency ratio | 0.229 | 0.1087 | 2.1058 | 0.0354 |
| Dummy variable for household head's education is secondary level incomplete or complete | 0.1687 | 0.0473 | 3.5675 | 0.0004 |
| Dummy variable for household head's education is institute level complete | 0.2637 | 0.0426 | 6.1918 | 0 |
| Dummy variable for household head's education is graduate/technical level or post graduate level complete | 0.3942 | 0.0573 | 6.8851 | 0 |
| Dummy variable for maximum education in the household is graduate/technical level or post graduate level complete | –0.1478 | 0.0409 | –3.612 | 0.0003 |
| Dummy variable for house provided by employer, free with and without arrangement with owner, random housing | –0.0566 | 0.0326 | –1.7354 | 0.0829 |
| Dummy variable for source of electricity is private generator | 0.1602 | 0.0262 | 6.1167 | 0 |
| Average distance to the nearest road in qhada | 0.0502 | 0.0148 | 3.3957 | 0.0007 |
| Dummy variable for household head is employed in the government/public sector | 0.1399 | 0.0293 | 4.7745 | 0 |
| Proportion of household members between ages 0 and 6 | –1.2854 | 0.1321 | –9.7335 | 0 |
| Proportion of household members between ages 7 and 17 | –1.0538 | 0.1004 | –10.5013 | 0 |
| Dummy variable for principal material of wall is brick | 0.1838 | 0.0302 | 6.0824 | 0 |
| Dummy variable for principal material of wall is clay, bamboo, or other | –0.1518 | 0.0403 | –3.7643 | 0.0002 |
| Dummy variable for ownership of washing machine | 0.1545 | 0.0286 | 5.3937 | 0 |

| Najaf | Coefficient | Std. Err. | t | \|Prob\|>t |
|---|---|---|---|---|
| Intercept | 4.9407 | 0.0898 | 55.0178 | 0 |
| Dummy variable for household head's age 60–69 | –0.2382 | 0.0464 | –5.1312 | 0 |
| Dummy variable for household head's age 70 or more | –0.3048 | 0.0625 | –4.8803 | 0 |
| Dummy variable for ownership of car | 0.2598 | 0.0321 | 8.0968 | 0 |
| Access of electricity from shared generator (days per week) | 0.0227 | 0.0085 | 2.676 | 0.0076 |
| Dummy variable for household head's education is primary level incomplete | –0.0867 | 0.042 | –2.0647 | 0.0394 |
| Dummy variable for closed drain, open drain, or other | –0.1819 | 0.0496 | –3.6683 | 0.0003 |
| Proportion of household members between ages 0 and 6 | –0.8441 | 0.1069 | –7.8961 | 0 |
| Proportion of household members between ages 7 and 17 | –0.8001 | 0.0878 | –9.1158 | 0 |
| Proportion of household members aged 60 or above | 0.9792 | 0.0939 | 10.4314 | 0 |
| Dummy variable for ownership of vacuum cleaner | 0.298 | 0.0338 | 8.8137 | 0 |
| Dummy variable for principal material of wall is brick | 0.0455 | 0.0443 | 1.0265 | 0.305 |
| Dummy variable for ownership of water heater | 0.1324 | 0.0395 | 3.3496 | 0.0009 |

| Qadisiyah | Coefficient | Std. Err. | t | \|Prob\|>t |
|---|---|---|---|---|
| Intercept | 4.1158 | 1.091 | 3.7725 | 0.0002 |
| Dummy variable for ownership of air conditioner | 0.1132 | 0.0274 | 4.1338 | 0 |
| Dummy variable for household head's age 50–59 | –0.0912 | 0.0306 | –2.983 | 0.0029 |
| Dummy variable for household head's age 70 or more | 0.1722 | 0.0561 | 3.0725 | 0.0022 |
| Dummy variable for born outside the governorate | –0.1563 | 0.0426 | –3.6696 | 0.0003 |
| Number of children between ages 7 and 17 | –0.0798 | 0.0076 | –10.5558 | 0 |
| Proportion of households owning cooker in nahiya | –0.7713 | 0.1731 | –4.4556 | 0 |
| Dummy variable for household head has no education | –0.0786 | 0.0324 | –2.4214 | 0.0157 |
| Number of household members aged 60 or above | –0.252 | 0.0327 | –7.6966 | 0 |
| Number of males employed = 1 | 0.1017 | 0.0239 | 4.2615 | 0 |
| Number of males employed = 3 | –0.0803 | 0.0452 | –1.7754 | 0.0762 |
| Dummy variable for ownership of generator | 0.1363 | 0.0227 | 5.9993 | 0 |
| Dummy variable for housing unit is house or flat | 0.1253 | 0.0426 | 2.9432 | 0.0033 |
| Dummy variable for ownership of personal computer | 0.2552 | 0.0411 | 6.2037 | 0 |
| Dummy variable for household head is employed in the government/public sector | 0.1429 | 0.0254 | 5.6292 | 0 |
| Proportion of household heads employed in government/public sector in nahiya | 1.5853 | 0.3441 | 4.6066 | 0 |
| Dummy variable for septic tank | 0.1357 | 0.0253 | 5.3648 | 0 |
| Proportion of household members between ages 0 and 6 | –0.5783 | 0.0822 | –7.0359 | 0 |
| Proportion of household members aged 60 or above | 1.1729 | 0.2434 | 4.8199 | 0 |
| Proportion of households with television in nahiya | 0.3725 | 1.1976 | 0.311 | 0.7559 |
| Dummy variable for ownership of vacuum cleaner | 0.1185 | 0.0485 | 2.4428 | 0.0148 |
| Dummy variable for principal material of wall is brick | 0.0704 | 0.0292 | 2.4135 | 0.016 |
| Dummy variable for ownership of washing machine | 0.1293 | 0.0267 | 4.8403 | 0 |
| Dummy variable for main source of drinking water is river/canal/creek/wheel, open well/covered well, pond/lake, spring, kehriz (man built spring) or other | 0.2107 | 0.0387 | 5.4397 | 0 |

| Muthana | Coefficient | Std. Err. | t | \|Prob\|>t |
|---|---|---|---|---|
| Intercept | 4.5534 | 0.0606 | 75.1531 | 0 |
| Number of children between ages 7 and 17 | –0.0574 | 0.0066 | –8.7278 | 0 |
| Dummy variable for ownership of cooler | –0.0304 | 0.0272 | –1.1182 | 0.2638 |
| Dummy variable for household head has no education | –0.068 | 0.0262 | –2.5933 | 0.0097 |
| Dummy variable for household head's education is institute level complete | 0.1423 | 0.0506 | 2.815 | 0.005 |
| Dummy variable for household head's education is graduate/technical level or post graduate level complete | 0.2176 | 0.0669 | 3.2553 | 0.0012 |
| Number of household members aged 60 or above | –0.1147 | 0.0252 | –4.5498 | 0 |
| Dummy variable for maximum education in the household is primary level complete | 0.0343 | 0.0295 | 1.1609 | 0.246 |
| Dummy variable for household head is employed in the government/public sector | 0.0723 | 0.031 | 2.3328 | 0.0199 |
| Dummy variable for closed drain, open drain, or other | –0.1159 | 0.0257 | –4.5101 | 0 |
| Proportion of household members between ages 0 and 6 | –0.6814 | 0.0877 | –7.7694 | 0 |
| Proportion of household members aged 60 or above | 0.6669 | 0.2058 | 3.2408 | 0.0012 |
| Dummy variable for ownership of vacuum cleaner | 0.1181 | 0.045 | 2.624 | 0.0089 |
| Dummy variable for principal material of wall is cement block, concrete readymade, or precast | –0.0802 | 0.0247 | –3.2477 | 0.0012 |
| Dummy variable for ownership of washing machine | 0.2057 | 0.0265 | 7.768 | 0 |

| Thi Qar | Coefficient | Std. Err. | t | \|Prob\|>t |
|---|---|---|---|---|
| Intercept | 5.4467 | 0.0601 | 90.6953 | 0 |
| Dummy variable for ownership of air conditioner | 0.0644 | 0.0232 | 2.7776 | 0.0056 |
| Dummy variable for ownership of car | 0.1211 | 0.0228 | 5.3074 | 0 |
| Access of electricity from private generator (days per week) | 0.0182 | 0.003 | 6.0164 | 0 |
| Dependency ratio | –0.2628 | 0.0436 | –6.0242 | 0 |
| Dummy variable for household head's education is institute level complete | 0.0876 | 0.0313 | 2.8005 | 0.0052 |
| Dummy variable for household head's education is graduate/technical level or post graduate level complete | 0.2048 | 0.0406 | 5.0473 | 0 |
| Dummy variable for ownership of freezer | 0.1461 | 0.021 | 6.9548 | 0 |
| Dummy variable for ownership of fridge | 0.1347 | 0.0303 | 4.4452 | 0 |
| Household size | –0.2168 | 0.0111 | –19.5221 | 0 |
| Square of household size | 0.0076 | 0.0006 | 13.2288 | 0 |
| Dummy variable for male | –0.0984 | 0.0327 | –3.0142 | 0.0026 |
| Dummy variable for maximum education in the household is primary level incomplete | –0.1203 | 0.0289 | –4.1566 | 0 |
| Dummy variable for house rented by households | 0.0944 | 0.0369 | 2.5595 | 0.0106 |
| Dummy variable for household head is employed in the government/public sector | 0.0582 | 0.0203 | 2.8614 | 0.0043 |
| Dummy variable for public sewage network | 0.1148 | 0.0311 | 3.6908 | 0.0002 |
| Proportion of household members between ages 7 and 17 | –0.0922 | 0.0472 | –1.9521 | 0.0512 |
| Dummy variable for ownership of vacuum cleaner | 0.1862 | 0.0343 | 5.4328 | 0 |
| Dummy variable for principal material of wall is brick | 0.0443 | 0.0211 | 2.1035 | 0.0357 |
| Dummy variable for ownership of washing machine | 0.0834 | 0.0213 | 3.9211 | 0.0001 |
| Dummy variable for ownership of water heater | 0.1102 | 0.0264 | 4.1723 | 0 |

| Missan | Coefficient | Std. Err. | t | \|Prob\|>t |
|---|---|---|---|---|
| Intercept | 7.4427 | 0.8849 | 8.4107 | 0 |
| Dummy variable for ownership of air conditioner | 0.1372 | 0.0249 | 5.5049 | 0 |
| Dummy variable for household head's age 30–39 | 0.0739 | 0.0251 | 2.9401 | 0.0033 |
| Average days of electricity from private generator in qhada | 0.2281 | 0.1042 | 2.1896 | 0.0287 |
| Average days of electricity from public network in nahiya | –0.4565 | 0.1435 | –3.1813 | 0.0015 |
| Average days of electricity from shared generator in qhada | 0.1161 | 0.0315 | 3.6899 | 0.0002 |
| Dummy variable for household head has no education | –0.0893 | 0.0272 | –3.2844 | 0.0011 |
| Dummy variable for household head's education is graduate/technical level or post graduate level complete | 0.3723 | 0.0453 | 8.2271 | 0 |
| Dummy variable for male | –0.3094 | 0.0346 | –8.9303 | 0 |
| Dummy variable for maximum education in the household is no education | 0.1726 | 0.0468 | 3.6874 | 0.0002 |
| Dummy variable for source of electricity is private generator | 0.0916 | 0.0265 | 3.4515 | 0.0006 |
| Dummy variable for household head is unemployed | –0.2696 | 0.0315 | –8.553 | 0 |
| Dummy variable for household head employed in the private sector | –0.1321 | 0.0256 | –5.1631 | 0 |
| Proportion of household members between ages 0 and 6 | –0.6436 | 0.0734 | –8.7679 | 0 |
| Proportion of household members between ages 7 and 17 | –0.7293 | 0.062 | –11.7611 | 0 |
| Dummy variable for source of electricity is shared generator | 0.1034 | 0.0346 | 2.9905 | 0.0028 |
| Proportion of household members aged 60 or above | 0.6113 | 0.0869 | 7.0378 | 0 |
| Share of working age males employed | 0.0865 | 0.0321 | 2.695 | 0.0071 |
| Dummy variable for ownership of vacuum cleaner | 0.214 | 0.0398 | 5.3733 | 0 |
| Dummy variable for principal material of wall is cement block, concrete readymade, or precast | –0.1561 | 0.0282 | –5.534 | 0 |
| Dummy variable for principal material of wall is clay, bamboo, or other | –0.1103 | 0.0449 | –2.455 | 0.0142 |
| Dummy variable for main source of drinking water is river/canal/creek/wheel, open well/covered well, pond/lake, spring, kehriz (man built spring) or other | –0.1302 | 0.035 | –3.7244 | 0.0002 |

| Basrah | Coefficient | Std. Err. | t | \|Prob\|>t |
|---|---|---|---|---|
| Intercept | 4.518 | 0.0423 | 106.7698 | 0 |
| Dummy variable for household head's age 20–29 | 0.0838 | 0.025 | 3.3472 | 0.0008 |
| Dummy variable for household head's age 50–59 | –0.0458 | 0.0222 | –2.0604 | 0.0395 |
| Dummy variable for household head's age 70 or more | –0.0944 | 0.0322 | –2.9315 | 0.0034 |
| Number of children between ages 0 and 6 = 0 | 0.462 | 0.022 | 20.9653 | 0 |
| Number of children between ages 0 and 6 = 1 | 0.2539 | 0.0199 | 12.7809 | 0 |
| Number of children between ages 0 and 6 = 2 | 0.1697 | 0.0196 | 8.6679 | 0 |
| Number of children between ages 0 and 6 = 10 | –0.8232 | 0.1265 | –6.5098 | 0 |
| Proportion of household members between ages 7 and 17 | –0.0915 | 0.0041 | –22.146 | 0 |
| Number of employed male = 0 | 0.1234 | 0.0259 | 4.762 | 0 |
| Number of employed male = 1 | 0.1161 | 0.0179 | 6.5011 | 0 |
| Dummy variable for ownership of freezer | 0.0691 | 0.0171 | 4.0301 | 0.0001 |
| Dummy variable for ownership of generator | 0.0838 | 0.0278 | 3.0124 | 0.0026 |
| Dummy variable for housing unit is clay house, bamboo house, or other | 0.275 | 0.1794 | 1.533 | 0.1255 |
| Dummy variable for married | –0.1014 | 0.0263 | –3.8502 | 0.0001 |
| Dummy variable for house rented by households | –0.0907 | 0.0228 | –3.9863 | 0.0001 |
| Dummy variable for source of electricity is private generator | 0.0605 | 0.0273 | 2.2213 | 0.0265 |
| Dummy variable for household head is employed in the government/public sector | 0.0853 | 0.0172 | 4.963 | 0 |
| Dummy variable for source of electricity is shared generator | 0.0537 | 0.024 | 2.2341 | 0.0256 |
| Dummy variable for ownership of vacuum cleaner | 0.1897 | 0.022 | 8.6279 | 0 |
| Dummy variable for principal material of wall is brick | 0.0846 | 0.0163 | 5.2013 | 0 |
| Dummy variable for principal material of wall is clay, bamboo, or other | –0.3441 | 0.1838 | –1.8727 | 0.0613 |

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| **Basrah** | **Coefficient** | **Std. Err.** | **t** | **\|Prob\|>t** |
|---|---|---|---|---|
| Dummy variable for ownership of washing machine | 0.0438 | 0.0181 | 2.4173 | 0.0158 |
| Dummy variable for ownership of water heater | 0.0977 | 0.02 | 4.8759 | 0 |
| Interaction of urban area with dummy variable for household head's education is graduate/technical level or post graduate level complete | 0.1117 | 0.0374 | 2.9894 | 0.0028 |
| Interaction of urban area with dummy variable for maximum education in the household is primary level incomplete | –0.1752 | 0.0269 | –6.5183 | 0 |

## Appendix C: Summary Statistics of Key Variables

| | IHSES | | | | IPMM | | | |
|---|---|---|---|---|---|---|---|---|
| | Mean | Std. Err. | [95% Conf. | Interval] | Mean | Std. Err. | [95% Conf. | Interval] |
| Urban | 0.68 | 0.01 | 0.66 | 0.70 | 0.70 | 0.00 | 0.69 | 0.71 |
| Household size | 8.42 | 0.06 | 8.29 | 8.54 | 7.64 | 0.02 | 7.60 | 7.68 |
| Household size sq. | 88.67 | 1.93 | 84.89 | 92.45 | 71.66 | 0.44 | 70.79 | 72.53 |
| Dependency ratio | 0.44 | 0.00 | 0.44 | 0.45 | 0.44 | 0.00 | 0.43 | 0.44 |
| Number of children between ages 0 and 6 | 1.84 | 0.03 | 1.78 | 1.89 | 1.61 | 0.01 | 1.59 | 1.62 |
| Proportion of household members between ages 0 and 6 | 0.21 | 0.00 | 0.20 | 0.21 | 0.20 | 0.00 | 0.20 | 0.20 |
| Number of children between ages 7 and 17 | 2.34 | 0.03 | 2.28 | 2.39 | 2.14 | 0.01 | 2.13 | 2.16 |
| Proportion of household members between ages 7 and 17 | 0.27 | 0.00 | 0.26 | 0.27 | 0.27 | 0.00 | 0.27 | 0.27 |
| Number of household members aged 60 or above | 0.40 | 0.01 | 0.39 | 0.42 | 0.33 | 0.00 | 0.32 | 0.33 |
| Proportion of household members aged 60 or above | 0.05 | 0.00 | 0.05 | 0.06 | 0.05 | 0.00 | 0.05 | 0.05 |
| Number of males employed | 1.46 | 0.01 | 1.44 | 1.49 | 1.29 | 0.00 | 1.28 | 1.30 |
| Share of working age males employed | 0.69 | 0.00 | 0.69 | 0.70 | 0.67 | 0.00 | 0.67 | 0.67 |
| Dummy variable for maximum education in the household is no education | 0.02 | 0.00 | 0.02 | 0.03 | 0.03 | 0.00 | 0.03 | 0.03 |
| Dummy variable for maximum education in the household is primary level incomplete | 0.09 | 0.00 | 0.08 | 0.10 | 0.08 | 0.00 | 0.08 | 0.08 |
| Dummy variable for maximum education in the household is primary level complete | 0.21 | 0.00 | 0.20 | 0.22 | 0.19 | 0.00 | 0.19 | 0.19 |
| Dummy variable for maximum education in the household is intermediate level incomplete or complete | 0.20 | 0.00 | 0.20 | 0.21 | 0.21 | 0.00 | 0.20 | 0.21 |
| Dummy variable for maximum education in the household is secondary level incomplete or complete | 0.16 | 0.00 | 0.15 | 0.17 | 0.17 | 0.00 | 0.17 | 0.17 |

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| | IHSES | | | | IPMM | | | |
|---|---|---|---|---|---|---|---|---|
| | Mean | Std. Err. | [95% Conf. | Interval] | Mean | Std. Err. | [95% Conf. | Interval] |
| Dummy variable for maximum education in the household is institute level complete | 0.10 | 0.00 | 0.10 | 0.11 | 0.10 | 0.00 | 0.10 | 0.10 |
| Dummy variable for maximum education in the household is graduate/technical level or post graduate level complete | 0.21 | 0.01 | 0.20 | 0.22 | 0.23 | 0.00 | 0.23 | 0.23 |
| Dummy variable for household head's age 20–29 | 0.06 | 0.00 | 0.06 | 0.07 | 0.07 | 0.00 | 0.07 | 0.07 |
| Dummy variable for household head's age 30–39 | 0.23 | 0.00 | 0.22 | 0.24 | 0.24 | 0.00 | 0.24 | 0.25 |
| Dummy variable for household head's age 40–49 | 0.31 | 0.01 | 0.30 | 0.32 | 0.31 | 0.00 | 0.31 | 0.31 |
| Dummy variable for household head's age 50–59 | 0.19 | 0.00 | 0.19 | 0.20 | 0.20 | 0.00 | 0.19 | 0.20 |
| Dummy variable for household head's age 60–69 | 0.14 | 0.00 | 0.13 | 0.15 | 0.12 | 0.00 | 0.12 | 0.12 |
| Dummy variable for household head's age 70 or more | 0.06 | 0.00 | 0.05 | 0.06 | 0.06 | 0.00 | 0.06 | 0.06 |
| Dummy variable for household head is male | 0.90 | 0.00 | 0.90 | 0.91 | 0.92 | 0.00 | 0.92 | 0.92 |
| Dummy variable for household head is born outside the governorate | 0.13 | 0.00 | 0.12 | 0.13 | 0.13 | 0.00 | 0.12 | 0.13 |
| Dummy variable for household head is married | 0.90 | 0.00 | 0.89 | 0.91 | 0.91 | 0.00 | 0.91 | 0.91 |
| Dummy variable for household head has no education | 0.23 | 0.00 | 0.22 | 0.24 | 0.23 | 0.00 | 0.23 | 0.23 |
| Dummy variable for household head's education is primary level incomplete | 0.15 | 0.00 | 0.14 | 0.16 | 0.11 | 0.00 | 0.11 | 0.12 |
| Dummy variable for household head's education is primary level complete | 0.28 | 0.00 | 0.28 | 0.29 | 0.29 | 0.00 | 0.29 | 0.29 |
| Dummy variable for household head's education is intermediate level incomplete or complete | 0.11 | 0.00 | 0.10 | 0.11 | 0.12 | 0.00 | 0.12 | 0.12 |
| Dummy variable for household head's education is secondary level incomplete or complete | 0.08 | 0.00 | 0.07 | 0.09 | 0.09 | 0.00 | 0.08 | 0.09 |
| Dummy variable for household head's education is institute level complete | 0.07 | 0.00 | 0.07 | 0.08 | 0.07 | 0.00 | 0.07 | 0.07 |

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| | IHSES | | | | IPMM | | | |
|---|---|---|---|---|---|---|---|---|
| | Mean | Std. Err. | [95% Conf. | Interval] | Mean | Std. Err. | [95% Conf. | Interval] |
| Dummy variable for household head's education is graduate/ technical level or post graduate level complete | 0.08 | 0.00 | 0.07 | 0.09 | 0.09 | 0.00 | 0.09 | 0.09 |
| Dummy variable for household head is unemployed | 0.28 | 0.01 | 0.27 | 0.29 | 0.31 | 0.00 | 0.31 | 0.32 |
| Dummy variable for household head is employed in the government/public sector | 0.29 | 0.01 | 0.28 | 0.30 | 0.29 | 0.00 | 0.29 | 0.30 |
| Dummy variable for household head employed in the private sector | 0.43 | 0.01 | 0.42 | 0.44 | 0.39 | 0.00 | 0.39 | 0.40 |
| Dummy variable for ownership of cooler | 0.89 | 0.00 | 0.89 | 0.90 | 0.89 | 0.00 | 0.89 | 0.89 |
| Dummy variable for ownership of fridge | 0.93 | 0.00 | 0.92 | 0.93 | 0.94 | 0.00 | 0.94 | 0.95 |
| Dummy variable for ownership of freezer | 0.49 | 0.01 | 0.48 | 0.50 | 0.50 | 0.00 | 0.50 | 0.51 |
| Dummy variable for ownership of washing machine | 0.70 | 0.01 | 0.68 | 0.71 | 0.71 | 0.00 | 0.70 | 0.71 |
| Dummy variable for ownership of generator | 0.36 | 0.01 | 0.35 | 0.37 | 0.28 | 0.00 | 0.28 | 0.29 |
| Dummy variable for ownership of water heater | 0.89 | 0.00 | 0.88 | 0.90 | 0.85 | 0.00 | 0.85 | 0.85 |
| Dummy variable for ownership of air conditioner | 0.42 | 0.01 | 0.40 | 0.43 | 0.40 | 0.00 | 0.39 | 0.41 |
| Dummy variable for ownership of vacuum cleaner | 0.30 | 0.01 | 0.29 | 0.31 | 0.29 | 0.00 | 0.28 | 0.30 |
| Dummy variable for ownership of car | 0.32 | 0.01 | 0.31 | 0.33 | 0.40 | 0.00 | 0.40 | 0.41 |
| Dummy variable for ownership of personal computer | 0.21 | 0.01 | 0.20 | 0.22 | 0.08 | 0.00 | 0.08 | 0.08 |
| Dummy variable for housing unit is house or flat | 0.94 | 0.00 | 0.93 | 0.94 | 0.95 | 0.00 | 0.94 | 0.95 |
| Dummy variable for housing unit is clay house, bamboo house, or other | 0.06 | 0.00 | 0.06 | 0.07 | 0.05 | 0.00 | 0.05 | 0.06 |
| Dummy variable for principal material of wall is brick | 0.45 | 0.01 | 0.44 | 0.46 | 0.45 | 0.00 | 0.44 | 0.46 |
| Dummy variable for principal material of wall is stone or thermo stone | 0.07 | 0.00 | 0.06 | 0.07 | 0.05 | 0.00 | 0.05 | 0.06 |

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(*continued*)

| | IHSES | | | | IPMM | | | |
|---|---|---|---|---|---|---|---|---|
| | Mean | Std. Err. | [95% Conf. | Interval] | Mean | Std. Err. | [95% Conf. | Interval] |
| Dummy variable for principal material of wall is cement block, concrete readymade, or precast | 0.43 | 0.01 | 0.41 | 0.44 | 0.43 | 0.00 | 0.42 | 0.44 |
| Dummy variable for principal material of wall is clay, bamboo, or other | 0.06 | 0.00 | 0.05 | 0.06 | 0.07 | 0.00 | 0.07 | 0.07 |
| Dummy variable for dwelling owned by household | 0.71 | 0.01 | 0.69 | 0.72 | 0.74 | 0.00 | 0.74 | 0.75 |
| Dummy variable for dwelling owned by private sector | 0.21 | 0.01 | 0.19 | 0.22 | 0.15 | 0.00 | 0.15 | 0.16 |
| Dummy variable for dwelling owned by government/public sector | 0.09 | 0.01 | 0.07 | 0.10 | 0.10 | 0.00 | 0.10 | 0.11 |
| Dummy variable for house owned by household | 0.71 | 0.01 | 0.69 | 0.72 | 0.74 | 0.00 | 0.74 | 0.75 |
| Dummy variable for house rented by households | 0.13 | 0.01 | 0.12 | 0.14 | 0.12 | 0.00 | 0.12 | 0.13 |
| Dummy variable for house provided by employer, free with and without arrangement with owner, random housing | 0.16 | 0.01 | 0.14 | 0.17 | 0.13 | 0.00 | 0.13 | 0.14 |
| Dummy variable for source of electricity is shared generator | 0.84 | 0.01 | 0.83 | 0.86 | 0.86 | 0.00 | 0.86 | 0.87 |
| Dummy variable for source of electricity is private generator | 0.31 | 0.01 | 0.30 | 0.32 | 0.25 | 0.00 | 0.25 | 0.26 |
| Access of electricity from public network (days per week) | 6.91 | 0.02 | 6.88 | 6.94 | 6.79 | 0.01 | 6.78 | 6.80 |
| Access of electricity from shared generator (days per week) | 5.60 | 0.06 | 5.49 | 5.71 | 5.91 | 0.02 | 5.87 | 5.94 |
| Access of electricity from private generator (days per week) | 1.17 | 0.03 | 1.10 | 1.24 | 0.83 | 0.01 | 0.80 | 0.85 |
| Dummy variable for public sewage network | 0.33 | 0.01 | 0.31 | 0.34 | 0.34 | 0.01 | 0.33 | 0.35 |
| Dummy variable for septic tank | 0.51 | 0.01 | 0.50 | 0.53 | 0.48 | 0.00 | 0.47 | 0.49 |
| Dummy variable for closed drain, open drain, or other | 0.16 | 0.01 | 0.15 | 0.17 | 0.18 | 0.00 | 0.17 | 0.18 |
| Dummy variable for main source of drinking water is public network | 0.88 | 0.01 | 0.87 | 0.90 | 0.88 | 0.00 | 0.88 | 0.89 |
| Dummy variable for main source of drinking water is river/canal/ creek/wheel, open well/covered well, pond/lake, spring, kehriz (man built spring) or other | 0.09 | 0.01 | 0.08 | 0.10 | 0.09 | 0.00 | 0.09 | 0.09 |