Sets	$V : 1...n$	Set of villages that EG is not already working in in Khandwa, Khargone, and Shivpuri
	$C : 1...k$	Set of clusters where k is the number of clusters
Parameters	$s_i, i \in V$	Predicted number of OOSC in village i
	$l_i, i \in V$	Latitude, longitude tuple of village i
	$\mu_k, k \in C$	Center of cluster k as a latitude and longitude tuple
	max_vill	Maximum number of villages allowed in cluster
	min_OOSC	Minimum number of OOSC in cluster k if cluster k has fewer than min_vill villages
	min_vill	Minimum number of villages a cluster must have if it has fewer than min_OOSC children
	goal	Number of villages EG wants to expand into
	dist_cap	Max distance that a village can be from its cluster center
	num_villages_k	Number of villages EG wants to expand into
Decision variables	$x_{ik}, i \in V, k \in C$	Binary variable that is 1 if village i is chosen for cluster k and 0 otherwise
	$z_k, k \in C$	Number of villages in cluster k

Table 1: Sets, Parameters, and Decision Variables of IP

Objective function	$\sum_{i \in V, k \in C \setminus 0} x_{ik}(s_i - .4 * dist(l_i, \mu_k)) - .0001 \sum_{k \in K \setminus 0} z_k$	Maximize total OOSC reached while minimizing the village-center distances. Also, force the z_k to zero when number of villages in a cluster is greater than min_vill (Not counting things in fake cluster)
Constraints	$\sum_{k \in C} x_{ik} = 1 \quad \forall i \in V$	Each village must be assigned to exactly one cluster
	$\sum_{i \in V, k \in C \setminus 0} x_{ik} \leq \text{goal}$	Total number of villages assigned to real cluster doesn't exceed EG's expansion goal Other villages will automatically be assigned to fake cluster 0 since all villages must be assigned somewhere
	$\sum_{i \in V} x_{ik} \leq \text{max\_vill} \quad \forall k \in C$	Number of villages in each cluster doesn't exceed EG's cap (Not counting things in fake cluster)
	$\sum_{k \in C} x_{ik} * dist(l_i, \mu_k) \leq \text{dist\_cap} \quad \forall i \in V$	Distance of each village from its cluster center is less than EG's cap (Not counting things in fake cluster)
	$\frac{(\text{min\_num}+1) - \text{num\_villages}_k}{\text{min\_num}+1} \leq z_k \quad \forall k \in C$	Make z_k 1 if cluster k has less than min_num villages and 0 otherwise
	$z_k * \text{min\_OOSC} \leq \text{num\_OOSC}_k \quad \forall k \in C$	If cluster k has less than min_num of villages then make sure it has more than min_OOSC

Table 2: Objective Function and Constraints of IP