Research Paper Commerce

Study Of Intra-State Goods Movement Through Gujarat

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ABSTRACT

There is close relation between economic growth & goods movement, employment & goods movement, consumer & goods movement, resources & goods movement, industries & goods movement. Various Goods movement forecasting models like commodity based, demography based, growth based had been in use to predict the goods flow across the region.
Gujarat is fast developing state with high growth rate resulting in increase industrial production & increased goods movement across different districts of the state.
Current study involves prediction of goods movement across Gujarat state on basis of state domestic product per capita income & consumer surplus/deficit using gravity model.
A goods movement matrix for trips between various districts of Gujarat is prepared, which needs to be validated.

KEYWORDS Goods movement, Origin & Destination (O&D), Consumer surplus & deficit, Regions domestic product (NDP, NSDP, NDDP, NTDP) Per capita income.

INTRODUCTION: Goods movement are caused by economic activity of production and consumption. A convenient way of thinking about goods movements problems is to identified the principle economic units in study area and to develop and understanding of their internal structure and the associated commodity movement demand .Goods transport is largely dependent on motorized road transport & rail transport in our country & state.

Economic growth is a major factor contributing to increase in Freight Transportation and development. Freight transportation encompasses the movement of a wide variety of products, from raw materials to finished goods, from comparatively low value-to-weight commodities such as coal, grain, and gravel to high value-to-weight items such as computer

parts and pharmaceuticals. It includes transport system, infrastructures and planning, firm's logistic strategies.

Gujarat state being the fastest growing state of country in last two decades, has observed phenomenal increase in regional goods movements which consists of interstate, intrastate movement.

STUDY AREA:
Gujarat state has divided into27 districts. Gujarat is very rapidly developing state of India. The state is bounded by Madyapradesh state in the east, by Maharashtra in the South and Rajasthan state in the North east.

Terminology of the important terms:-

1. GDP (Gross Domestic Product):- The GDP can be defined as summation of consumption, investments, government expenditure and net export of the whole country.

The equation for calculating GDP is,

GDP = C + I + GE + (X – M)

C = Consumption, I = Investment, Ge = Government expenditure, x = Export,

M = Import

In other words the GDP is equal to gross national product minus property income from abroad.

2. GNP (GROSS NATIONAL PRODUCT):-The GNP can be defined as summation of consumption, investment, government expenditure and net export and net payment received from abroad of the country.

The equation for calculating GNP is,

GNP = C + I + GE + (X-M) + (R-P)

3. NSDP (Net State Domestic Product):- The NSDP can be defined as summation of consumption, investment, government expenditure, net export and net payment received from other state & abroad of the state.

$$NSDP = [NDP * \frac{Ps.As}{\sum P.A}]$$

Where $P_s.A_s$ = Population & Area of individual state

$\sum P.A$ =Population & Area of country

4. NDDP (Net District Domestic Product) = $[NSDP * \frac{Pd.Ad}{\sum PG.AG}]$

P_d, A_d = Population & area of the individual district.

PG, AG = Population & area of Gujarat.

5. NTDP (Net Taluka Domestic Product) = $[NDDP * \frac{Pt * At}{\sum PA.AA}]$

P_t, A_t = Population & area of the individual Taluka.

P_A, A_A = Population & area of Aravali.

6. Produced Surplus/ Deficit of the state = [NSDP – Consumption of NSDP]

7. Produced Surplus/ Deficit of the district = [NDDP – Consumption of NDDP]

8. Produced Surplus/ Deficit of the Taluka = [NTDP – Consumption of NTDP]

9. Consumption of NSDP = $\frac{\text{Per capita income of the state}}{\text{per capita income of the country}}$ * All India NDP

10. Consumption of NDDP = $\frac{\text{Per capita income of the district}}{\text{per capita income of the state}}$ * All Gujarat NSDP

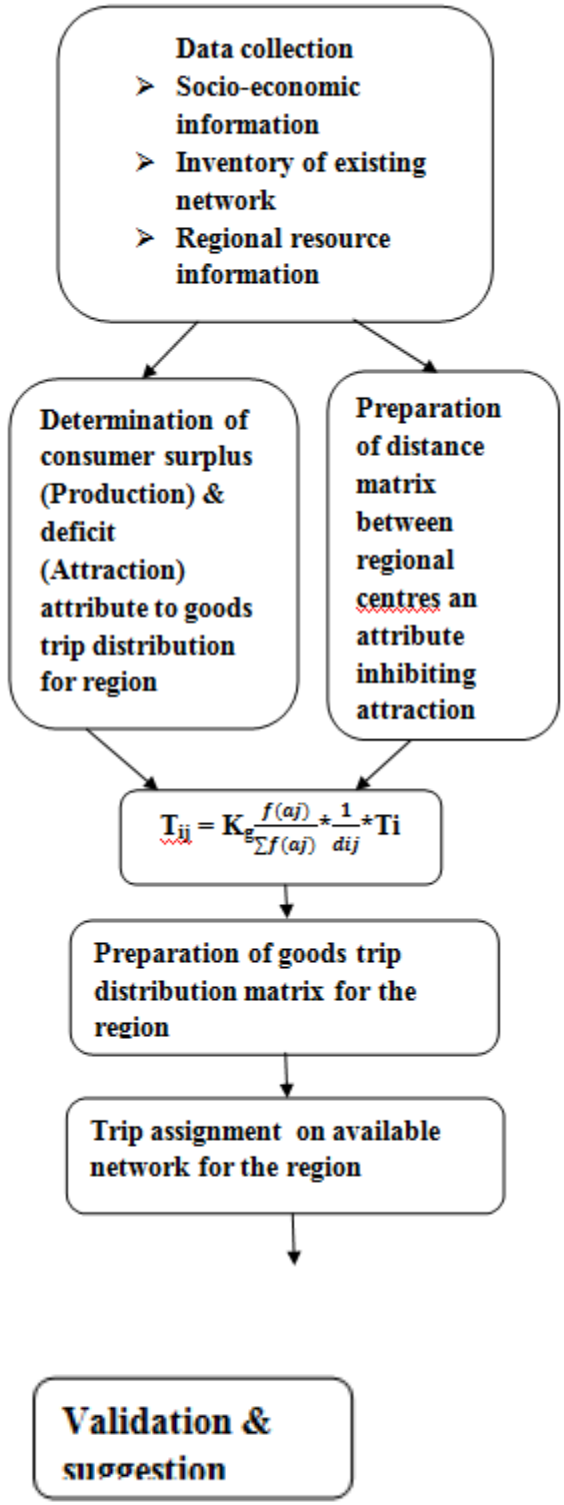
11. Consumption of NTDP = $\frac{\text{Per capita income of the taluka}}{\text{per capita income of the district}}$ * All Aravali NDDP

12. AADGT (Average annual daily goods traffic)

Assumptions: - Socio-econometric situation considers distribution of goods (product) to thesurrounding with following assumptions:

1. Consumption of product is a function of individuals (Population) income i.e. per capita income & population.
2. Surplus production is distributed from origin (production place) in proportion to per capita income & population of the region & inversely proportional to the distance from place of production to region.(Trip production)
3. Deficit in production is distributed to origin (User place/deficient place) in proportion to population & per capita income of the region & inversely proportional to the distance from place of deficit to production centres.(Trip attraction)
4. Goods Trips were assigned the routes considering the shortest path available in existing road network.
5. Income is the source of attraction.
6. Net production in any region is directly proportional to available population and area of the region.
7. One truck can carry 25 tonnes of load.
8. Contribution of domestic product to transportation cost is taken as 4% of domestic product.(Ref
9. Positive value indicates surplus i.e. trips will be generated from that place. Negative value indicates deficit i.e. trip will be attracted from other place to that place.

Methodology (flow chart):-



Analysis & Findings: Gravity models suggested in methodology is used and truck trips are distributed across various districts of Gujarat state which is shown in O/D matrix as Annexure1.

Conclusion: Using the gravity model goods movement across the state of Gujarat for the year 2015 is predicted, which is shown in O/D matrix.

Sr no	District	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
1	KACHCHH	0	239	75	197	79	12	157	266	368	388	41	185	139	202	54	70	65	55	120	34	86	16	24	31	50	36	50
2	BANAS KANTHA	387	0	144	298	73	12	150	122	76	77	10	44	36	81	37	50	40	31	76	19	49	8	12	15	26	18	47
3	PATAN	41	49	0	20	10	2	20	20	13	16	1	7	7	10	5	6	5	4	9	2	6	1	2	2	3	2	6
4	MAHESANA	190	177	36	0	75	12	152	95	48	47	6	27	22	53	28	41	27	20	54	12	33	5	8	9	16	11	34
5	SABARKANTHA	46	26	10	44	0	5	42	19	14	14	2	8	6	15	8	18	8	6	16	4	9	1	2	3	5	3	24
6	GANDHINAGER	7	4	2	7	5	0	18	4	3	2	0	1	1	3	2	3	2	1	3	1	2	0	0	0	1	1	2
7	AHMEDABAD	646	378	149	647	303	130	0	507	279	253	32	142	147	313	247	429	184	115	394	74	199	24	41	49	89	59	150
8	SUREDRANAGER	212	60	30	78	27	6	98	0	132	93	10	51	41	95	26	36	26	19	51	12	31	5	8	9	16	11	17
9	RAJKOT	750	95	47	102	50	9	139	338	0	575	45	147	231	224	45	61	50	40	95	26	63	10	16	21	34	25	34
10	JAMNAGER	404	50	31	51	25	4	64	122	294	0	20	146	81	97	22	29	25	21	47	13	33	6	9	11	19	13	17
11	PORBANDAR	4	1	0	1	0	0	1	1	2	2	0	2	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0
12	JUNAGADH	258	38	17	39	19	3	48	89	100	195	40	0	133	99	16	21	19	16	36	8	25	5	7	9	14	10	13
13	AMRELI	90	14	8	15	7	1	23	33	74	50	8	62	0	68	6	8	8	7	13	4	9	2	3	3	5	5	6
14	BHAVNAGER	298	74	28	81	40	7	113	176	163	137	19	104	155	0	34	47	38	30	72	19	48	8	12	15	26	22	30
15	ANAND	54	23	8	29	14	3	60	32	22	21	3	12	9	23	0	96	26	13	103	11	30	4	4	6	11	7	13
16	KHEDA	79	35	13	48	35	5	118	51	34	31	4	17	14	35	108	0	38	19	93	13	35	5	5	7	14	9	20
17	PANCH MAHALS	77	29	10	33	16	3	53	38	29	29	4	16	15	30	31	40	0	47	80	14	35	4	7	8	15	10	26
18	DAHOD	57	19	7	21	10	2	29	24	20	21	3	12	11	21	14	17	40	0	35	8	20	3	4	5	10	8	15
19	VADODARA	271	106	39	127	62	13	216	145	105	102	13	58	47	110	233	186	152	76	0	87	251	16	32	36	73	46	46
20	NARMADA	3	1	0	1	1	0	2	1	1	1	0	1	1	1	1	1	1	1	3	0	3	0	0	1	1	1	0
21	BHARUCH	58	20	7	23	11	2	33	26	21	21	3	12	10	22	20	21	20	13	75	23	0	5	13	13	31	19	8
22	DANGS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	NAVSARI	13	4	1	4	2	0	5	5	4	5	1	3	2	4	2	2	3	2	8	3	10	3	0	12	28	6	2
24	VALSAD	24	7	3	7	4	1	9	9	8	8	1	5	4	8	4	5	5	4	12	5	14	5	18	0	21	9	3
25	SURAT	171	55	20	57	28	5	74	68	58	61	9	35	28	59	37	42	43	32	111	43	159	24	181	93	0	76	24
26	TAPI	8	2	1	2	1	0	3	3	3	3	0	2	2	3	1	2	2	2	4	2	6	2	3	2	5	0	1
27	ARAVALI	18	10	4	13	15	1	13	8	6	6	1	3	3	7	5	7	8	5	7	2	4	1	1	1	3	2	0

ANNEXURE:1O/D matrix numbers of trucks to and from different district of Gujarat state (2015)