

# Fuzzy Set Theory Approach to Socio-Economic Status of Migrated Students Studying in Chennai, Using Amartya Sen's Functioning Multidimensional Paradigm

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**Abstract** - Migration of any kind creates social exclusion in society, leading to inability to participate in economic, social, and cultural life, and in some characteristics, alienation and distance from mainstream society. Migration of students is one the burning social issues today, which finally affects the academic progress and level of performance of the students. The main purpose of this paper is to suggest practical implementation of Sen's capability approach that is able to preserve its interpretative reality and methodological problems that couldn't find an operative solution in more standard approaches to migrated students and their socio-economic well-being analysis. A strategy based on fuzzy sets theory has been suggested to analyze why this kind of approach could be useful for dealing with the complexity of a multidimensional assessment of well-being. Finally, the analysis depicts that the student community and their well-beings in terms of safe living, educations, social and psychological well-being is affected very badly.

**Keywords:** Fuzzy Set, Capability approach, Functioning's, Multidimensional analysis of well-being.

## I. INTRODUCTION

India is a country having within itself a multi-cultural and multi-ethnic society. 'Unity in Diversity' is the jargon that is repeated often on stage. Migrated Students, all over the world, face certain difficulties and challenges yet there are certain specific regional flavors to their new demands. The issue analyzed through this paper is on the well-being of migrated students living mainly in Chennai city. A study has been conducted with college students migrated from Tibet, South Africa, Bangladesh, Sri Lanka, East Timor, Bihar, Jharkhand, Odisha, West Bengal, Assam, Chhatisgarh, Andaman-Nikobar, Meghalaya, Tripura, Nagaland, Manipur, Mizoram, Delhi and Uttarpradesh. Majority of the migrated students think of themselves or feel treated by others as 'different'. Why do the majority of migrated students made to think or feel 'different'? Spoken language, physical appearance, dress habits, food habits, cultural traits and level of social security and economic independence are some of the attributes that differentiates migrated students from other students.

## II. THE WELL-BEING CONCEPT

The well-being is defined in association with one's current standard of life and it is not an easy concept to express it in

clear cut terms and definitions. Initially it has been measured through the income per capita, but this showed itself to be insufficient to explain such a complex concept. The capability approach, introduced by A. Sen, looks at freedom, human rights and defines human well-being in terms of functioning and capabilities, where functioning are achievements of human well-being and capabilities the ability to achieve them.

Well-being refers to being able to live a long, healthy and educated lifestyle that is locked within a decent social security system that one is allowed to and capable to use. A vast variety of measurements, such as average life expectancy, school enrollment and literacy rates for example, can be used in this discussion. However, the question of how to measure the happiness of student or children is not easily resolved. The dimensions depend on the availability of data and the distinction between doing well and being well has to be emphasized throughout the research. The following dimensions of well-being were established by UNICEF to examine "child well-being"

- Material well-being
- Health and Safety
- Educational well-being
- Relationships
- Behaviors and Risks
- Subjective well-being

Those are neat categories, but it is not always clear whether a particular characteristic is a problem or only correlated with one. Thus, very different outcomes can be found throughout the report. Well-being can be explained as the following function:

Well-being of migrant children =  $f(H, B, C, D)$  where  
 $H$  is the vector of human capital variables, for example age, health care access, educational opportunities,  
 $B$  stands for demographic and economic characteristics such as gender and race.  $C$  can be the vector of the country of origin and  
 $D$  captures the effects that are particular to immigrant groups.

### 2.1 Social Responsibility as well-being:

Some quotes on Social responsibility: "Social responsibility-that is, a personal investment in the well-being of others and of the planet-doesn't just happen. It takes intention, attention, and

time."-- Sheldon Berman, "Educating for Social Responsibility," Educational Leadership, November 1990.

"Students can and should be given opportunities to take part in the significant events in their world. As teachers, we can create very powerful opportunities for our students, both in the classroom and extending into the larger world....We can help them understand processes of group decision making and the political process. And, we can structure ways for them to participate in the empowering experience of acting to make a real difference in the world." --ESR's Making History.

Some may question Berman's definition of social responsibility. What constitutes "well-being"? Exactly who are the "others"? Will the well-being of others be promoted by free trade agreements? By immigration reform? Thus, Well-being means different things to different people.

## 2.2 Sen's Functioning Multidimensional Approach to Well-being

Sen frequently uses the well-being of someone with ability of someone who can *achieve* with a given amount of wealth, depends on certain conditions, and any measure of inequality has to take these "conversion factors" into account, focusing on outcomes rather than means.

### 2.2.1 Sen's Capability Theory

The capability approach was initially conceived in the 1980s as an approach to welfare economics. In this approach, Amartya Sen brought together a range of ideas that were hitherto excluded from (or inadequately formulated in) traditional approaches to the economics of welfare. The core focus of the capability approach is on what individuals are able to do

Capabilities refer to things a person can achieve or could have achieved in life. The notion of capability is essentially one of freedom. This theory helps us to be a part of society that is having friends, freedom to pursue education, freedom to pursue career, freedom to be mobile, freedom to have job of one's liking, ability to marry, ability to raise a family, and ability to pursue spiritual goals. It would be useful research to examine the extent of role of the capabilities in predicting the well being of persons with migrants. Interventions can also be designed to modify capabilities in the lives of persons with migration. Initially Sen argued for five components in assessing capability:

1. The importance of real freedoms in the assessment of a person's advantage.
2. Individual differences in the ability to transform resources into valuable activities.
3. The multi-variate nature of activities giving rise to happiness.
4. A balance of materialistic and non-materialistic factors in evaluating human welfare.
5. Concern for the distribution of opportunities within society.

Formulations of capability have two parts: functionings and opportunity freedom – the substantive freedom to pursue different functioning combinations. Ultimately, capabilities denote a person's opportunity and ability to generate valuable outcomes, taking into account relevant personal characteristics

and external factors. The important part of this definition is the "freedom to achieve"; the reason being, if freedom had only instrumental value – valuable as a means to achieve an end – and no intrinsic value – valuable in and of itself – to a person's well being, then the value of the capability set as a whole would simply be defined by the value of a person's actual combination of functionings. Consequently, the capability set outlined by this approach is not merely concerned with achievements; rather, freedom of choice, in and of itself, is of direct importance to a person's quality of life. Take the example of fasting as a functioning; there is an important difference between fasting and starving because, in examining a starving person's achieved well being, it is critical to consider whether the individual is personally choosing not to eat or whether the person cannot eat because they lack the means to acquire an adequate amount of food.

In this example, therefore, the functioning is starving but the capability to obtain an adequate amount of food is the key element to be considered in evaluating well being between individuals in the two states. In sum, choosing a lifestyle is not exactly the same as having that lifestyle no matter how chosen, and a person's well being does depend on how that lifestyle came to be. For this reason, while the combination of a person's functionings represents their actual achievements, their capability set represents their opportunity freedom – their freedom to choose between alternative functioning combinations.

### 2.2.2 Functionings

Functionings refer to a mixture of "doings and beings" or the various options or actions we perform in everyday life to achieve things in life. Functioning ranges from achieving basic things such as obtaining food and maintaining health, to more complex tasks such as achieving inner peace or performing leadership role in the community. Sen, in his theory promotes an equality of capabilities and not necessarily an equality of functionings that makes it interesting and different from many other theorists some of the functionings that can be measured are: performing activities of daily living, obtaining food, procuring clothing, living in own home, using transportation or driving, having enough friends, having enough family support, doing work, raising a family, pursuing a career, being active in the neighborhood, being active in town, being active in the state, being active nationally and internationally.

In the most basic sense, functionings consist of "beings and doings". As a result, living may be seen as a set of interrelated functionings. Essentially, functionings are the states and activities constitutive of a person's being. Examples of functionings can vary from elementary things, such as being healthy, having a good job, and being safe, to more complex states, such as being happy, having self-respect, and being calm. Moreover, Amartya Sen contends that functionings are crucial to an adequate understanding of the capability approach; capability is conceptualized as a reflection of the freedom to achieve valuable functionings. In other words, functionings are the subjects of the capabilities referred to in the approach: what we are capable, want to be capable, or should be capable to be and/or do. Therefore, a person's chosen combination of functionings, what they are and do, is part of their overall capability set – the functionings they were able to

do. Yet, functionings can also be conceptualized in a way that signifies an individual's capabilities. Eating, starving, and fasting would all be considered functionings, but the functioning of fasting differs significantly from that of starving because fasting, unlike starving, involves a choice and is understood as choosing to starve despite the presence of other options. Consequently, an understanding of what constitutes functionings is inherently tied together with an understanding of capabilities, as defined by this approach.

### 2.2.3 Well-being:

Well-being refers to one's own welfare. Besides preference fulfillment (which is commonly the only interpretation in utilitarian paradigms), well being also includes a feeling of satisfaction and other features of a person's life, such as their attained state of health. In the context of migrated students this construct can be measured by measuring the extent of ability to get good education and services one wants, feeling of satisfaction, and self perceived healthy living.

Thus, the real measure of well-being had to be not the actual functioning which a person exercised, but *capability* — the set of functionings from which one can choose. So for example, the university graduate who is serving tables has an unmistakable advantage over their uneducated colleague, for they have a *choice*, just as the adventurer who suffers exposure while mountain climbing is obviously more advantaged than the slum-dweller who freezes out of necessity.

### III. A MULTIDIMENSIONAL ASSESSMENT OF WELL-BEING

Well-being has been evaluated on the basis of a list of achieved functionings instead of capabilities. Attention has been confined to a set of five functionings - housing, health, education and knowledge, social interactions and psychological conditions - to which corresponds a large spectrum of elementary indicators, mainly qualitative and on an ordinal scale, sometimes dichotomous. The functionings selected and the correlated indicators are, therefore, the following

1) Housing (safer living/campus security) is the result of two main indicators : i) a crowding index, defined as the number of rooms available for each student "corrected" by equivalence coefficients to take into account the economies of scale ; ii) a basic housing utilities measure that includes telephone, regular water availability and heating.

2) Health conditions are described by the presence/absence of chronic illnesses. Information available is related to a list of fifteen chronic illnesses with different degrees of seriousness. Three homogenous clusters have been determined : a first group includes chronic illnesses with not very serious disability consequences , the second group refers to severe chronic illnesses that generates a partial disability, while the last group includes the more serious or incurable illnesses.

3) Education and knowledge are measured by means of three ordinal indicators: the higher educational attainment and two variables that refer to personal knowledge in a wider sense that

is the number of books read during the last twelve months and the frequency of reading newspapers during a week.

4) Social interactions are depicted by two subsets of indicators that respectively refer to the social relationships during the leisure time (frequency of contact and meeting with friends) and to the participation in the social life.

5) Psychological conditions are described by a plurality of indicators that express a subjective perception on one's own situation or a personal judgment about the level of satisfaction regarding some relevant aspects of one's own life. Nine variables measured on ordinal scales have been included in our analysis and re-arranged in five homogenous groups that refer to : i) economic conditions; ii) personal and social relations; iii) health conditions; iv) working conditions ;v) leisure time.

However, the decision to consider also the subjective dimension of well-being is justified by the fact that it doesn't substitute but just complements our assessment and permits us to compare the results derived from the use of objective and subjective evaluation criteria. At the same time, the concept of "being well" in the sense of being happy, having self respect, and satisfying one's own desires assumes an important role in determining the personal well-being achievement (see Sen, 1992,1993) . Of course, these aspects are only partially reflected in our available data.

### IV. THE USE OF FUZZY SETS THEORY FOR A FUZZY ASSESSMENT OF WELL-BEING

In the capability approach, well-being can be seen as a broad and fuzzy concept that is intrinsically complex and vague in the sense that it is not possible to express a clear cut boundaries and definitions. Deprivation too is not an "all-or-nothing condition" that identifies a certain class of people, but rather a vague predicate that manifests itself in different degrees. When we refer to a given functioning, such as healthy living or education and knowledge, we can think that it could be fully achieved by a person or not achieved at all, but more often it will be only partially fulfilled.

At the same time, when we make an attempt to measure the well-being of the migrated individual's well-being, we presumably work with a wide set of indicators that can assume quantitative or qualitative values or linguistic attributes such as good, bad, low, high living and so on.

A useful tool for the treatment of "inexact knowledge" and approximate reasoning is represented by the fuzzy set theory. First introduced by Lotfi A. Zadeh (1965) and extensively applied in many areas of research, this theory has also recently gained considerable attention in inequality and well-being analysis and in poverty measurement.

In a nutshell, fuzzy set theory substitutes the characteristic function of a crisp set that traditionally assigns a value of either 1 or 0 to each element in the universal set (Discriminating between members and non-members of the crisp set), with a generalized characteristic function (called membership function) which varies between 0 and 1. Larger values denote

higher degrees of membership. In formal terms, if X denotes a universal set, then the membership function  $\mu_A$ , by which a fuzzy set A is usually defined, has the form

$$\mu_A : X \rightarrow [0, 1] \quad [1]$$

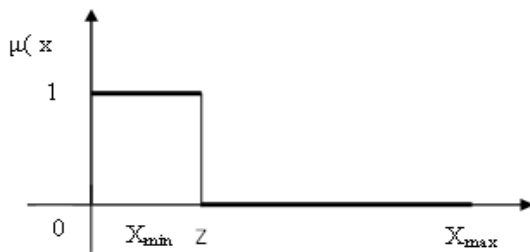
Where  $[0, 1]$  is the interval of real numbers from 0 to 1. Hence,  $\mu_A(x) = 0$  if the element  $x \in X$  does not belong to A,  $\mu_A(x) = 1$  if x completely belongs to A and  $0 < \mu_A(x) < 1$  if x partially belongs to A.

Let us assume that the subset A defines the position of each individual according to the degree of achievement of a given attainment or refers to one of the indicators considered for the functioning assessment. When we consider quantitative variables or qualitative variables measured on an ordinal scale or expressed with linguistic attributes (as in the case of health and physical condition or subjective opinions or perception on one's own conditions), intermediate values between 0 and 1 describe gradual positions within the arrangement. In this case, it will be necessary: i) to define an appropriate arrangement of modalities (or values) on the basis of the different degrees of hardship/well-being; ii) to identify the two extreme conditions such that  $\mu_A(x) = 1$  (full membership) and  $\mu_A(x) = 0$  (non-membership); iii) to specify the membership functions for all the other intermediate positions.

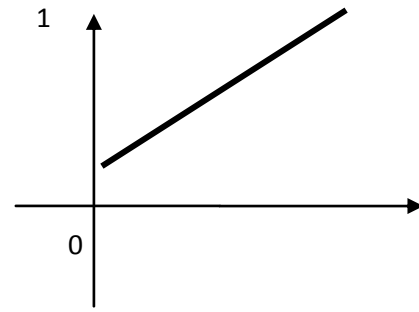
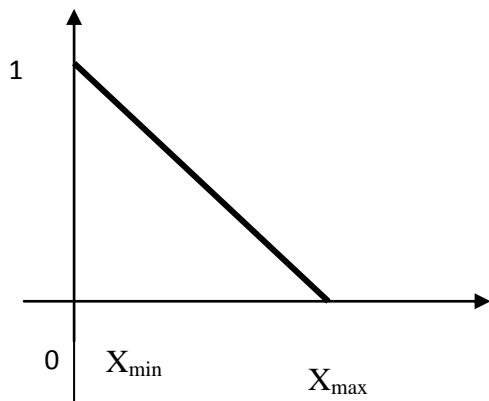
1. Traditional approach

$$\mu(x) = 1 \text{ if } 0 \leq x \leq z$$

$$\mu(x) = 0 \text{ if } z \leq x \leq X_{max}$$



2. Linear function



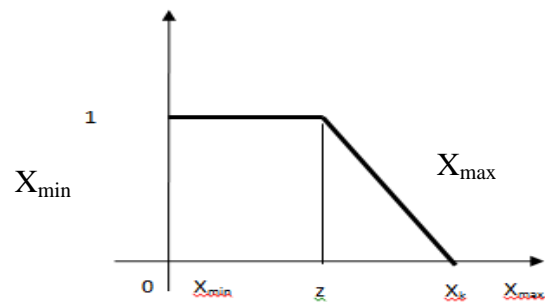
$$\mu(x) = \frac{X_{max} - X}{X_{max} - X_{min}} \mu(x) = \frac{X - X_{min}}{X_{max} - X_{min}}$$

3. Trapezoidal Function

$$\mu(x) = 1 \text{ if } X_{min} \leq x \leq z$$

$$\mu(x) = 0 \text{ if } X_k \leq x \leq X_{max}$$

$$\mu(x) = \frac{X_k - x}{X_k - z} \text{ if } z \leq x \leq X_k$$



The choice of the proper membership function depends on the application context and on the kind of indicator that we want to describe. For instance, in cases of variables with equi-distributed modalities along an ordinal scale, the linear functions indicated in graph can be appropriate. Otherwise, if it is possible to identify a given interval above and below which it is possible to define the opposite conditions of full membership and no-membership, a trapezoidal function can be chosen.

The basic operations in crisp sets theory, i.e. union and intersection have been generalized with reference to the fuzzy sets, so that for both those operations there exists a broad class of function operations. Let's assume, for simplicity, only two fuzzy sets A and B (with reference to the first aggregation step, they could respectively concern elementary indicators of a given functioning), the most common class of operations of which are the following:

1. Fuzzy intersection : this requires the simultaneous satisfaction of each elementary condition and corresponds to the logical conjunction "and" :standard (or strong) intersection

$$\mu_{A \cap B} = \min [\mu_A, \mu_B] \quad [1.1]$$

Weak intersection (or algebraic product)

$$\mu_{A \cdot B} = [\mu_A \cdot \mu_B] \quad [1.2]$$

bounded difference

$$\mu_{A \cap B} = \max [0, \mu_A + \mu_B - 1] \quad [1.3]$$

and the relationship among them is

$$\mu_{A \cap B} \leq \mu_{A \cdot B} \leq \mu_{A \cup B} \quad [2]$$

2. Fuzzy union: The satisfaction of at least one of the conditions is, in this case, required. This notion corresponds to the logical disjunction “or” for which some interchangeability among the arguments is assumed or admitted.

Standard (or strong) union

$$\mu_{A \cup B} = \max[\mu_A, \mu_B] \quad [2.1]$$

weak union (or algebraic sum)

bounded sum

$$\mu_{A+B} = [\mu_A + \mu_B - \mu_A \cdot \mu_B] \quad [0 \ 2]$$

bounded sum and the relationship among them is :

$$\mu_{A \cup B} = \min[1, \mu_A + \mu_B] \quad [2.3]$$

$$\mu_{A \cup B} \leq \mu_{A+B} \leq \mu_{A \cdot B} \quad [3]$$

Since each of these aggregation procedures satisfies a different axiom structure share common property commutative, associative and assumes a distinctive meaning, the choice among them is strictly related to the specific context of analysis. However, some brief general remarks about these operations could be useful for understanding their meaning. Standard intersection and union operations focus, respectively, on the least and the most favorable position, so the membership grades to the composite set will be the lower value of  $\mu$  to the elementary sets in the former case, and the highest values in the latter. They implicitly excluded that there may be any sort of compensation between indicators, and it can be a proper aggregation in case of a positive correlation between them (i.e.  $A \uparrow B \uparrow$ ).

On the contrary, the second class of operators (1.2 and 2.2) admits the possibility of compensation, leads to evaluation criteria reflecting both classifications, and could be an adequate operation for aggregating independent indicators (i.e.  $A \perp B$ ). Finally, bounded difference and bounded sum have a more frequent use in the case of a negative correlation between indicators ( $A \uparrow B \downarrow$ ), but they reduce the possibility to “fuzzify” the extreme values. A different way to consider any kind of aggregation operation on  $n$  fuzzy sets (with  $n \geq 2$ ) is to define a function :

$$h : [0,1]^n \rightarrow [0,1] \quad [4]$$

If applied to  $n$  fuzzy sets  $A_1, A_2, A_3, \dots, A_n$  defined on  $X$ , function  $h$  produces an aggregate (fuzzy) set by operating on the membership grades of these sets for each element  $x$ . In other words :

$$\mu_A(x) = h(\mu_{A_1}(x), \mu_{A_2}(x), \dots, \mu_{A_n}(x)) \quad [5]$$

The union and intersection operators discussed above represent a special case of this generalization. If we simply denote with  $a_1, a_2, \dots, a_n$  the membership grades of each element belonging to sets  $A_1, A_2, A_3, \dots, A_n$  the relationship within the class of operators is the following :

$$\min(a_1, a_2, \dots, a_n) \leq h(a_1, a_2, \dots, a_n) \leq \max(a_1, a_2, \dots, a_n) \quad [6]$$

A minimal axiomatic structure is usually associated with the function  $h$  and the included boundary condition, monotonicity, continuity and symmetry. A parametric class of operators satisfying this axiomatic structure is the generalized means :

$$h_\alpha(a_1, a_2, \dots, a_n) = [(a_1^\alpha + a_2^\alpha + a_3^\alpha + \dots + a_n^\alpha) / n]^{1/\alpha} \quad [7]$$

with  $\alpha$  equal to 1 for the arithmetic mean,  $\alpha = -1$  for the harmonic mean and  $\alpha = 0$  for the geometric mean. Finally, if we remove the symmetry axiom, a class of weighted averaging operations can be derived :

$$h_\alpha = (a_1, a_2, \dots, a_n, w_1, w_2, \dots, w_n) \left[ \sum w_i a_i^\alpha \right]^{1/\alpha} \quad [8]$$

Where the weighting structure, expressed by  $w_i \geq 0$  and  $\sum w_i = 1$  specifies the relative importance assigned to each aggregate set. The selection of a suitable weighting structure is an old and questionable issue.

In a multidimensional approach, if each dimension of human well-being is considered as equally relevant, a neutral choice could be to assign an equal weight to all constitutive elements, as in [8]: in this way we are not called upon to express uneasy judgments or to define a ranking among them. Alternatively, if we want to maintain an “objective” approach to the measurement, a *frequency-based weighting* can be adopted, and in this case the weighting structure is directly drawn from reality. Desai, Shah (1988), for instance, define  $w_i$  as the complement to one to the proportion of deprived people. Cerioli, Zani (1990), suggest defining  $w_i$  as an inverse function of the frequency of the corresponding symptom of deprivation :

$$w_i = \ln 1/f_i \quad [9]$$

where the choice of the logarithm is justified with the opportunity of not giving too much importance to the modalities showing a very low frequency. In a similar way, but with a direct relation to the above membership function [2], Cheli, Lemmi (1995) specify the following weighting structure :  $w_i = \ln \left[ \frac{1}{n} \sum_j \mu_{ij} \right]$  [10]. That represents a generalization of the previous weighting structure [9]. An overall index of well-being has been computed for each reference unit through union, intersection and average operators. This is particularly true for

multidimensional analysis's where dimensions of well-being that are qualitatively and intrinsically distinct are assessed.

Example: Migrated Students' Multidimensional Well Being

Fuzzy Relations: In the following example, a fuzzy relation is conveniently represented by n-dimensional membership array whose entries correspond to n-tuple in the universal set. The entries take values representing the membership grade of the corresponding n-tuples.

Let R be a fuzzy relations between the Migrated students say Set  $X = (x_1, x_2, \dots, x_n)$  and Functionings Set  $Y = (y_1, y_2, \dots, y_n)$  that is ( $y_1$  -housing or safe living,  $y_2$  -Health,  $y_3$  -Education and knowledge,  $y_4$ - social interactions and  $y_5$  -psychological conditions respectively) which represent the relational concept, R="Well-Being." The multidimensional membership grades are given bellow.

This example can be interpreted based on Max- Min composition.

$$\mu_{R \circ R_i}(x_i, z_i) = \text{Max}_{y_i} [\text{Min}(\mu_R(x_i, y_i), \mu_R(y_i, z_i))]$$

The Max- Min Composition is associative

$$\text{i.e } R \circ (Y \circ Z) = (R \circ Y) \circ Z$$

Sen's Multidimensional well-being assessment average membership degrees by personal and social characteristics are given by-

### V. THE RESULTS

This result shows that relatively low fulfillment in education and knowledge as well as in the participation in the social life outside of family and friends affects the migrated students. The degree of satisfaction regarding the main spheres of their own life, and especially for education, social interaction, personal and psychological condition is significantly low. A slight disparity, mainly in health, education, knowledge and participation in the social life that, however, does not affect the subjective perception of their own condition, as the differences between migrants as such. Health, education and social life have the lowest performance in the case of migrants. The picture is more exhaustive if we observe the results in terms of functionings achieved for different groups of the population which, however, to a large extent reflects the above results related to elementary indicators. With reference to the subjective and relational dimensions of well-being, the membership degrees to the psychological functioning are, on average, relatively low for all groups without meaningful differences. Therefore, it seems possible to affirm that the list of relevant functionings chosen has allowed us to depict a richer picture and to capture complementary dimensions of human well-being.

The last step of our analysis refers to an overall index of individual well-being. We report the average membership degrees to the composite fuzzy set obtained by union,

intersection and average operators on the five elementary fuzzy subsets. The different meaning of these operators has to be considered when we look at their absolute value: standard intersection operator refers to the worst performance in the functionings space, so it could be interpreted as a sort of deprivation index in (at least) one of the elementary dimensions of well-being; on the other hand, the union operator highlights the better performance, and it could be assumed to be the distance from a full achievement in (at least one) well-being dimension; finally, the un-weighted average lies in-between and postulates a condition of symmetry among elementary subsets. Thus we can guess the some comprehensive level of understanding of the migrated students stay in and around Chennai.

The study substantiates that migration of any kind creates social exclusion in society; which finally affect the well-being of the students as well as society in general. Thus Sen's theory is very much applicable to the topic which we have dealt with.

| R     | $x_1$ | $x_2$ | $x_3$ | $x_4$ | $x_5$ |
|-------|-------|-------|-------|-------|-------|
| $y_1$ | 0.6   | 0.5   | 0.4   | 0.3   | 0.4   |
| $y_2$ | 0.4   | 0.5   | 0.6   | 0.5   | 0.7   |
| $y_3$ | 0.2   | 0.3   | 0.1   | 0.2   | 0.4   |
| $y_4$ | 0.4   | 0.5   | 0.4   | 0.3   | 0.5   |
| $y_5$ | 0.3   | 0.4   | 0.5   | 0.2   | 0.4   |

Future Recommendations: Social Inclusive Integrated Approach. To achieve this goal, it is needed to invest significant resources in a variety of activities and initiatives designed to increase security in campus; there is need to increase students' ability to make responsible decisions that enhance their well-being and leverage positive relationship with local law enforcement agencies by mixing with each other. It is recommended to give highest priorities at the University level by providing the safety and well-being to students, faculty and staff. In order to work to the best, though it is essential to look after physical, emotional, spiritual and social wellbeing that students socialize, have fun, relax, and enjoy being together.

| igrated Students(C ountry wise or area) | Standard Union operator | Standard Intersection operator | Un-weighted average operator |
|---|-------------------------|--------------------------------|------------------------------|
| $x_1$                                   | 0.907                   | 0.216                          | 0.545                        |
| $x_2$                                   | 0.922                   | 0.246                          | 0.575                        |
| $x_3$                                   | 0.898                   | 0.215                          | 0.539                        |
| $x_4$                                   | 0.900                   | 0.185                          | 0.507                        |
| $x_5$                                   | 0.899                   | 0.191                          | 0.513                        |

### VI. CONCLUSIONS

The main purpose of this paper is to suggest practical implementation of Sen's capability approach that is able to preserve its interpretative reality and methodological problems that couldn't find an operative solution in more standard

approaches to migrated students and their well-being analysis. A strategy based on fuzzy sets theory has been suggested to analyze why this kind of approach could be useful for dealing with the complexity of a multidimensional assessment of well-being. With the aim of testing this methodology, an empirical exercise based on micro-data referred to migrated students has been done and more clarifying analysis of well-being dimensions has been obtained. The analysis depicts that the poorer group affected by migration is the student community and their well-beings in terms of safe living, educations, social and psychological well-being.

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