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Importance Rearrangement within Education, Economy and Natural Protection Ministries for Armenian Composite Supportive Progress (ACASP)

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Abstract

Sustainable Development is an innovative concept characterized as Composite Appraising Supportive Progress of Armenia (ACASP). Biodiversity concept is another topic having a vast power on public management and employment. Social, economic and environmental impacts optimize sequences within Education (S_3), Economy (E_5), Air (N_3) & Land (N_1) Ministries. Seven (7) phases of Operation Research (OR) studies correspond to nine (9) procedures of composite progressive indicators. Two (2) techniques are applied as decision making of utility function and transportation tasks. North-West Corner Rule (NWCR) and Low Cost Cell Rule (LCCR) are applied to manage public employment as per Education (S_3), Economy (E_5), Land (N_1) and Air (N_3) magnitudes of ACASP.

A motivating approach is pertained not only to pick the order of significance as per biodiversity concept, but also to characterize the process of decision making through operation research techniques, particularly transportation assignments as per origins and destinations with supply and demand applications. The resulting sequence is revealed by sustenance of biodiversity concept with public employment of Armenian CASP.

Keywords: Armenian Composite Appraising Supportive Progress (ACASP), sustainable as bio-diverse development, decision making, public employment, operation research, transportation assignments, Composite Progressive Indicators (CPI)

1. Introduction

Petrosyan (2014, 2010, 2005) exposes the worldwide researches centralizing on three (3) ways of Sustainable Development (SD) depictions. A modern concern is examined in four (4) magnitudes of Sustainable Development (SD) as Composite Appraising Supportive Progress (CASP) utilizing Biodiversity concept (Nijkamp and Vindigni, 2003) and Operation Research (OR) characteristics (Midgley and Reynolds, 2004) in Table 1. The main emphasis of the current paper is to compose a decision making for the public management and employment (F) based on not only Decision Trees & Utility Theories but also transportation tasks using Northwest Corner Rule / Low Cost Methods on Education (S_3), Economy (E_5), Land (N_1) and Air (N_3) magnitudes of ACASP.

Table 1. Portrayal of SD, ACASP, OR Characteristics and Biodiversity Concept

No	SD/ Management	Biodiversity Concept	OR Chara-cteristics	OR Design Approach	References
	Petrosyan (2014, 2010, 2005)		Midgley and Reynolds (2004)		Petrosyan (2014)
α.	Society (S) / Education	Genes	Interdisciplinary	Boundary Critique	Holistic Illustration of SD Framework (Lyytimaki and Rosenstrom, 2008)
β.	Economy (E) / Economy	Species	Systems Orientation	Improvement	SD Proposed by Russian Dolls Model (Levett, 1998)
γ.	Environment (N) / Natural Protection	Ecosystem	Purposefulness	Methodological Pluralism	Primary Concept of SD (Walton etc, 2005)
δ.	Sustainability / Public Employment	Functions	Transportation Tasks	Northwest Corner / Low Cost Methods	ACASP (Petrosyan 2015 a,b,c, 2014)

Source: < http://redfame.com/> own case study

2. Literature Review

Sustainability is considered as one of the biggest worldwide challenges in the twenty-first century and it is widely believed that the nations which disregard this fact are subject to various problems in the long term (Riasi and Pourmiri, 2016). Even though sustainability has never been accurately resolved, Composite Appraising Supportive Progress (CASP) is a recent index to assess Combined Sustainable Development Index (CSDI). Three (3) incorporated magnitudes, i.e., society, economy and nature, are portrayed in the book of Petrosyan (2014) and the paper of Petrosyan (2010) with six (6) Armenian categories as per each magnitude for Republic of Armenia (RA) and Nagorno-Karabakh Republic ministries and areas as in Table 2 and Figure 1.

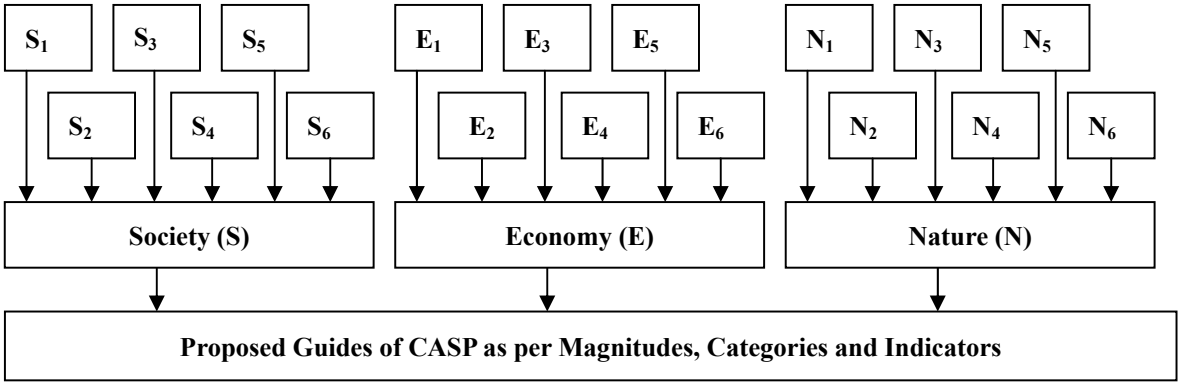

Figure 1. Proposed Guides of CASP as per Magnitudes, Categories and Indicators

Source: Petrosyan (2014)

Runge (2012) observes the Decision Trees & the Utility Theories with sum of multiplication of pertinent utility function (U_i) and probability (P_i) in (1).

$$DM_i = \sum_{i=1}^{n} P_i U_i \quad (1)$$

Perceptions of Synthetic Measure (SM) or variation of Decision Making (DM) are accomplished by Balcerzak (2015) in (2) as per Utility function (U_i) of already described subcategories within an applicable category with its equally distributed probabilities (P_i) and the number (n) of Utility Function.

$$DM_i = SM_i = \left(\sum_{i=1}^{n} U_i\right) / n \quad (2)$$

Murthy (2007) prescribes the subject of operations research as a branch of applied mathematics, used to supply a scientific support for economic management and to make decisions to the specified problems on-time and efficiently. The universal approach is to investigate the economic issues and to execute the solution while considering the other aspects, i.e. human, social and political constraints. An attractive approach is applied through operation research techniques to ACASP while transforming composite progressive indicators (Petrosyan, 2015d) into solving the transportation problems.

Gupta and Cozzolino (1975) portrays five (5) elements to transportation problems as:

1.A set of m origins: O_1, O_2, ..., O_m;

2.A set of n destinations: D_1, D_2, ...D_n;

3. A set of supplies of indistinguishable units: a_1 - O_1, a_2 - O_2, a_m - O_m;

4. A set of requirements: b_1 - D_1, b_2 - D_2, b_m - D_m;

5. A set of unit shipment costs: c_{ij} is the cost of shipping 1 unit from O_i to D_j with m x n such costs as inputs.

The total cost of the shipment schedule is represented in (3) as a function of the decision variables.

$$MinZ = \sum_{i=1}^{m} \sum_{j=1}^{n} c_{ij} x_{ij} \quad (3)$$

Table 2. Armenian Categories Representation of CASP - RA & NKR Ministries & Areas

No	Armenian Categories	CASP Categories	Ministries	Areas
Society (S)				
S_1	Demography	Humans	Ministry of Territorial Administration and Emergency Situations http://www.mta.gov.am	Askeran Marz
S_2	Employment	Society Concerns	Ministry of Labor and Social Affairs http://www.mlsa.am	Syunik Marz
S_3	Education	Knowledge in Practice	Ministry of Education and Science http://www.edu.am	Shirak Marz
S_4	Science	Space Science	Ministry of Defence http://www.mil.am/	Lori Marz
S_5	Economic Activities	Political Performance	National Assembly of the Republic of Armenia http://parliament.am/	Yerevan Marz
S_6	Transport & Communication	Transport	Ministry of Transport and Communication http://www.mtc.am	Vayots-Dzor Marz
Economy (E)				
E_1	Finances	Investment	Ministry of Finance http://www.minfin.am/	Qashatagh Marz
E_2	Living Conditions	Human Standards	Ministry of Culture http://www.mincult.am	Armavir Marz
E_3	Prices Tariffs	Production - Consumption	Ministry of Urban Development http://www.mud.am/	Shushi Marz
E_4	Agriculture	Agriculture	Ministry of Agriculture www.minagro.am/	Ararat Marz
E_5	Industry	Industry	Ministry of Economy www.mineconomy.am	Aragatsotn Marz
E_6	Trade and Services	Tourism	Ministry of Diaspora mindiaspora.am Ministry of Foreign Affairs mfa.am	Martuni Marz
Nature (N)				
N_1	Land			Hadrut Marz
N_2	Water		Ministry of Nature Protection	Gegharkuniq
N_3	Air		http://www.mnp.am	Martakert
N_4	Biodiversity			Tavush Marz
N_5	Energy		Ministry of Energy and Natural Resources www.minenergy.am/en	Kotayk Marz
N_6	Eco-Resources		Ministry of Nature Protection http://www.mnp.am	Shahumyan Marz

Source: Petrosyan (2016)

The supply constraints are applied in (4).

$$\sum_{j=1}^{n} x_{ij} = a_i \, for (i = 1,...,m) \tag{4}$$

The demand constraints are computed in (5).

$$\sum_{i=1}^{m} x_{ij} = b_j \, for (j = 1,...,n) \tag{5}$$

The diagram for the methods for finding feasible solution is depicted in Figure 2.

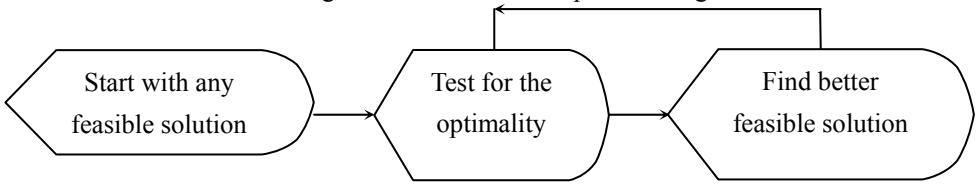

Figure 2. Methods for Finding Feasible Solution

Source: Gupta and Cozzolino (1975)

3. Materials and Methods

3.1 Study Area

Armenia (Figure 3) is located in the southern Caucasus and covers approximately 10% of the Armenian upland (29,800 km^2). Mainly, the military phase complies with theoretical and logic asymmetric conflicts during 1992-1994 over Nagorno-Karabakh with specific factors led to victory (Deriglazova and Minasyan, 2011). Nowadays, Nagorno-Karabakh Republic, i.e. Artsakh, (Figure 3) is a smaller (4400 km^2) autonomous area between Armenia and Azerbaijan. Armenia and Nagorno-Karabakh support diversity of landscapes with a range of species, due to their geographic position (Arakelyan and Parham, 2008). ARMSTAT (2015) represents statistic data for eleven (11) Armenian areas and NKRSTAT (2015) presents seven (7) areas of Nagorno Karabakh Republic as depicted in Figure 3.

Figure 3. Map of eleven (11) Armenian and seven (7) Nagorno-Karabakh areas

Source: Petrosyan (2016)

3.2 Data Sets

Eighteen (18) categories are reviewed for Armenian Composite Supportive Progress (ACASP) in Table 2 and Figure 1, as per Armenian or Nagorno-Karabakh areas. The current paper prescribes management as process of preservations, activities and interactions between biodiversity stages (Petrosyan, 2014). Data sets and indicators options are offered as per ministries of Republic of Armenia (RA) in Table 3.

Table 3. Data Sets and Indicators Options as per Corresponding Ministry of RA

No	SD magnitudes	Biodiversity Concept	Management	Ministry	Area / Figure
α.	Society (S)	Genes	Education (S_3)	Ministry of Education and Sciencewww.edu.am	Shirak Marz / Figure 4
β.	Economy (E)	Species	Economy (E_5)	Ministry of Economy www.mineconomy.am	Aragatsotn Marz / Figure 5
γ.	Environment (N)	Ecosystem	Land (N_1)	Ministry of Nature Protection http://www.mnp.am	Hadrut Marz / Figure 6
			Air (N_3)		Martakert Marz / Figure 7
δ.	Sustainability	Functions	Public Employment (ACASP)	State Employment Agency www.emplyment.am	Yerevan Marz / Figure 8

Source: Petrosyan (2016)


Figure 4. S_3Shirak Marz

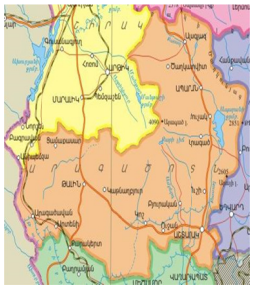
Figure 5. E5 Aragatsotn Marz


Figure 6. N1Hadrut Marz

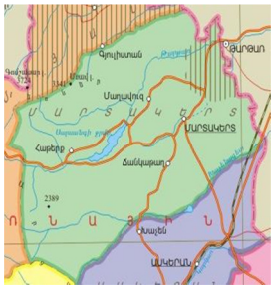
Figure 7. N3Martakert Marz


Figure 8. ACASP Yerevan

Source: Petrosyan (2016), Petrosyan (2016), Petrosyan (2016), Petrosyan (2016), Petrosyan (2016).

3.3 Methodology

Hillier &Liberman (2001) summarizes seven (7) phases of an Operation Research (OR) studies related to nine (9) Petrosyan (2015d & 2016) procedures of composite progressive indicators. The current methodology of the current paper has several steps, showing strong emphasis on sustainable development and the composite appraisal of supportive progress as:

(1) Define the problem-operation research approaches as per ACASP;

(2) Gather relevant data-data collection performance through already created magnitudes, categories, sub-categories and indicators of ACASP;

(3) Formulate a mathematical model-transportation problem definition through transshipment approaches of ACASP;

(4) Develop procedures for deriving solutions - prescription to origins, destinations, supplies and demands in transportation revision for ACASP;

(5) Test and refine the model-implementations of Northwest Corner Rule and Low-Cost Cell Methods for ACASP;

(6) Prepare ongoing applications - computation of total cost as per categorical indicators of ACASP.

(7) Implement - choice of the best solution using aforementioned operation research approaches of ACASP.

4. Results

4.1 Education (S_3)-Shirak Marz

4.1.1 Data Sets Retrievals

Petrosyan (2016) describes the methodology of data sets retrieval from Republic of Armenia (RA) Ministry of Education and Science (MES) and guides to the summarized results of the first (1st) and the second (2nd) versions of data retrievals for Education (S_3)-Shirak Marz in Figure 4 & Table 4.

Table 4. 1st& 2nd Versions of Data Retrievals for Education (S_3)-Shirak Marz

1st Version of Education (S_{31})				2nd Version of Education (S_{32})			
Category		Summed numbers		Category		Summed numbers	
No.	Name	Sub-category	Indicators	No.	Name	Sub-category	Indicators
S_{311}	Legislation	5	300	S_{321}	Public Views	4	83
S_{312}	Education	9	189	S_{322}	Vacancies	4	37
S_{313}	Science	3	50	S_{323}	Social Packages	2	45
S_{314}	Inspections	6	140	S_{324}	International Cooperation	4	199
S_{315}	Licensing	1	7	S_{325}	Announcement / News	3	110
S_{316}	Publication	5	89	S_{326}	Informative Contacts	4	91

Source: <http://redfame.com/>own case study

4.1.2 Decision Making as Utility Function of Education (S_3) Magnitude

Decision Making as Utility Function of Education (S_3) Magnitude is computed as per (2). The results of DM_i are provided in Table 5 for the 1st and the 2nd versions of Education (S_3) Magnitude-Shirak Marz.

Table 5. 1st and 2nd Versions of Decision Making (DM_i) Computation for Education (S_3)

Magnitude (Category)			DM_i	Magnitude (Category)			DM_i
No.	Name	Range		No.	Name	Range	
S_{311}	Legislation	1	60	S_{321}	Public Views	5	20.75
S_{312}	Education	3	21	S_{322}	Vacancies	6	9.25
S_{313}	Science	5	16.67	S_{323}	Social Packages	3	22.5
S_{314}	Inspections	2	23.33	S_{324}	Global Cooperation	1	49.75
S_{315}	Licensing	6	7	S_{325}	Announcement / News	4	22
S_{316}	Publication	4	17.8	S_{326}	Informative Contacts	2	22.75

Source: Petrosyan (2016)

4.1.3 Constructions of Operation Research Approaches as Transportation Problem for Education (S_3) Magnitude

An interesting approach is retrieved from Petrosyan (2016) paper and Gupta & Cozzolino (1975) book. Data sets are represented in Table 6 by Origins as numbers of existing indicators and Destinations as active categories of Education (S_3) Magnitude.

Data sets are sustained as per initial order, derived from Table 4 and exemplified in Table 6. Another interesting approach is viewed in Table 7 through data sets representation with Origins as numbers of existing indicators and Destinations as active categories. Data sets are kept as per created order of Table 5, derived from Table 4 and represented in Table 7.

Table 6. Data Sets with Origins and Destinations as per Preliminary Order for Education (S_3)

		Origins S_{31}		Origins S_{32}		Demand
Destinations	**1**	300	5	83	4	9
	2	189	9	37	4	13
	3	50	3	45	2	5
	4	140	6	199	4	10
	5	7	1	110	3	4
	6	89	5	91	4	9
Supply			29		21	

Source: < http://redfame.com/> own case study

Table 7. Data Sets with Origins and Destinations as per Created Order for Education (S_3)

		Origins S_{31}		Origins S_{32}		Demand
Destinations	**1**	300	5	199	4	9
	2	140	6	91	4	10
	3	189	9	45	2	11
	4	89	5	110	3	8
	5	50	3	83	4	7
	6	7	1	37	4	5
Supply			29		21	

Source: < http://redfame.com/> own case study

4.2 Economy (E_5)-Aragatsotn Marz

4.2.1 Data Sets Retrievals

Petrosyan (2016) describes the methodology of data sets retrieval from RA Ministry of Economy and directs to the summarized results of the first (1st) and the second (2nd) versions of Economy (E_5)-Aragatsotn Marz in Figure 5 & Table 8.

Table 8. 1st& 2nd Versions of Data Retrievals for Economy (E_5) - Aragatsotn Marz

1st Version Economy (E_{51})				**2nd Version Economy (E_{52})**			
Category		**Summed numbers**		**Category**		**Summed numbers**	
No.	**Name**	**Sub-category**	**Indicators**	**No.**	**Name**	**Sub-category**	**Indicators**
E_{511}	Structure	4	52	E_{521}	Tourism	6	72
E_{512}	Legal Acts	6	248	E_{522}	Information Technology	3	86
E_{513}	Projects	4	129	E_{523}	Market Controls	9	325
E_{514}	Policies	6	249	E_{524}	Vacancies	2	195
E_{515}	Publication	8	296	E_{525}	Inspections	6	165
E_{516}	Worldwide Economic Cooperation	5	100	E_{526}	Informative Contacts	4	96

Source: < http://redfame.com/> own case study

4.2.2 Decision Making as Utility Function of Economy (E_5) Magnitude

Decision Making as Utility Function of Economy (E_5) Magnitude is computed as per (2). The results of DM_i are provided in Table 9 for the 1st and the 2nd versions of Economy (E_5) Magnitude-Aragatsotn Marz.

Table 9. 1st and 2nd Versions of Decision Making (DM_i) Computation for Economy (E_5)

1st Version Magnitude (Category)				**2nd Version Magnitude (Category)**			
No.	**Name**	**Range**	**DM_i**	**No.**	**Name**	**Range**	**DM_i**
E_{511}	Structure	6	13	E_{521}	Tourism	6	12
E_{512}	Legal Acts	2	41.33	E_{522}	IT	3	28.67
E_{513}	Projects	4	32.25	E_{523}	Market Controls	2	36.11
E_{514}	Policies	1	41.5	E_{524}	Vacancies	1	97.5
E_{515}	Publication	3	37	E_{525}	Inspections	4	27.5
E_{516}	Worldwide Economic Cooperation	5	25	E_{526}	Informative Contacts	5	24

Source: Petrosyan (2016)

4.2.3 Constructions of Operation Research Approaches as Transportation Problem for Economy (E_5) Magnitude

A motivating approach is extracted from the paper of Petrosyan (2016) and the book of Gupta &Cozzolino (1975). Data sets are depicted by Origins as numbers of existing indicators and Destinations as active categories of Economy (E_5) Magnitude. Data sets are sustained as per preliminary order, obtained from Table 8 and illustrated in Table 10.

Another smart approach is inspected in Table 11 through data sets representation with Origins as numbers of existing indicators and Destinations as active categories of Economy (E_5) Magnitude. Data sets are pertained as per created order of Table 9, acquired from Table 8 and represented in Table 11.

Table 10. Data Sets with Origins and Destinations as per Preliminary Order for Economy (E_5)

		Origins E_{51}		Origins E_{52}		Demand
Destinations	1		4		6	10
		52		72		
	2		6		3	9
		248		86		
	3		4		9	13
		129		325		
	4		6		2	8
		249		195		
	5		8		6	14
		296		165		
	6		4		4	8
		100		96		
Supply			32		30	

Source: < http://redfame.com/> own case study

Table 11. Data Sets with Origins and Destinations as per Created Order for Economy (E_5)

		Origins E_{51}		Origins E_{52}		Demand
Destinations	1		6		2	8
		249		195		
	2		6		9	15
		248		325		
	3		8		3	11
		296		86		
	4		4		6	10
		129		165		
	5		4		4	8
		100		96		
	6		4		6	10
		52		72		
Supply			32		30	

Source: < http://redfame.com/> own case study

4.3 Land (N_1) - Hadrut Marz and Air (N_3)-Martakert Marz

4.3.1 Data Sets Retrievals

Petrosyan (2016) portrays the methodology of data sets retrieval from RA Ministry of Nature Protection (MNP) and leads to the summarized results of the first (1st) Version as Air (N_3)-Martakert Marz (Figure 6) and the second (2nd) version as Land (N_1)-Hadrut Marz (Figure 7) in Table 12.

Table 12. Data Retrievals for 1st Version of Air (N_3)-Martakert Marz& 2nd Version of Land (N_1)-Hadrut Marz

1st Version Air (N_{31})				**2nd Version Land (N_{12})**			
Category		**Summed numbers**		**Category**		**Summed numbers**	
No.	**Name**	**Sub-category**	**Indicators**	**No.**	**Name**	**Sub-category**	**Indicators**
N_{311}	Structure	3	82	N_{121}	International Cooperation	2	49
N_{312}	Regulation	8	273	N_{122}	Projects	6	208
N_{313}	Reports	3	47	N_{123}	Natural Resources	4	128
N_{314}	Vacancies	3	26	N_{124}	Inspectorial Activities	8	157
N_{315}	Atmosphere	4	230	N_{125}	Informative Contacts	3	74
N_{316}	Publications	5	367	N_{126}	Nature Protection	4	175

Source: < http://redfame.com/> own case study

4.3.2 Decision Making as Utility Function of Air (N_3)-Land (N_1) Magnitude

Decision Making as Utility Function of Air (N_3) & Land (N_1) Magnitude is calculated as per (2). The results of DM_i are provided in Table 13 for the 1st Version of Air (N_3)-Martakert Marz and the 2nd version of Land (N_1)-Hadrut Marz.

Table 13. 1st& 2nd Versions of Decision Making (DM_i) Computation for Air (N_3) & Land (N_1)

1st Version / Air (N_3) Magnitude (Category)			DM_i	2nd Version / Land (N_1) Magnitude (Category)			DM_i
No.	**Name**	**Range**		**No.**	**Name**	**Range**	
N_{311}	Structure	4	27.33	N_{121}	International Cooperation	5	24.5
N_{312}	Regulation	3	34.13	N_{122}	Projects	3	34.67
N_{313}	Reports	5	15.67	N_{123}	Natural Resources	4	32
N_{314}	Vacancies	6	8.67	N_{124}	Inspectorial Activities	6	19.63
N_{315}	Atmosphere	2	57.5	N_{125}	Informative Contacts	1	83
N_{316}	Publications	1	73.4	N_{126}	Nature Protection	2	43.75

Source: Petrosyan (2016)

4.3.3 Constructions of Operation Research Approaches as Transportation Problem for Air (N_3)-Land (N_1) Magnitude

An encouraging approach is attained from the paper of Petrosyan (2016) and the book of Gupta &Cozzolino (1975). Data sets are exposed by Origins as numbers of existing indicators and Destinations as active categories of Air (N_3)-Land (N_1) Magnitude. Data sets are preserved as per preliminary order, acquired from Table 12 and typified in Table 14.

Table 14. Data Sets with Origins-Destinations for Preliminary Order for Air (N_3)-Land (N_1)

		Origins N_{31}		Origins N_{12}		Demand
Destinations	1		3		2	5
		82		49		
	2		8		6	14
		273		208		
	3		3		4	7
		47		128		
	4		3		8	11
		26		157		
	5		4		3	7
		230		74		
	6		5		4	9
		367		175		
Supply			26		27	

Source: < http://redfame.com/> own case study

Another optimistic approach is examined in Table 15 through data sets representation with Origins as numbers of existing indicators and Destinations as active categories of Air (N_3)-Land (N_1) Magnitude. Data sets are pertained as per created order of Table 13, acquired from Table 12 and represented in Table 15.

Table 15. Data Sets with Origins & Destinations as per Created Order for Air (N_3)-Land (N_1)

		Origins N_{31}		Origins N_{12}		Demand
Destinations	1		5		3	8
		367		74		
	2		4		4	8
		230		175		
	3		8		6	14
		273		208		
	4		3		4	7
		82		128		
	5		3		2	5
		47		49		
	6		3		8	11
		26		157		
Supply			26		27	

Source: < http://redfame.com/> own case study

4.4 Employment (ACASP)-Yerevan Marz

4.4.1 Data sets retrievals

Petrosyan (2016) explains the methodology of data sets retrieval from State Employment Agency (SEA) and pilots the summarized results of the first (1st) and the second (2nd) versions of Employment (F)-Yerevan Marz in Figure 8 & Table 16.

Table 16. 1st& 2nd Versions of Data Retrievals for Employment (F)-Yerevan Marz

1st Version Employment (F_1) Category No.	Name	Summed numbers Sub-category	Indicators	2nd Version Employment (F_2) Category No.	Name	Summed numbers Sub-category	Indicators
F_{11}	Structure	2	13	F_{21}	Jobseekers	6	62
F_{12}	Legislation	2	9	F_{22}	Employers	1	9
F_{13}	Membership	2	7	F_{23}	Programs	2	57
F_{14}	Publication	2	7	F_{24}	Labour Market	5	39
F_{15}	Announcements / News	2	43	F_{25}	International Cooperation	3	23
F_{16}	Informative Contacts	4	38	F_{26}	Analyses Researches	4	91

Source: < http://redfame.com/> own case study

4.4.2 Decision Making as Utility Function of Employment (F)

Decision Making as Utility Function of Employment (F) Magnitude is determined as per (2). The results of DM_i are offered in Table 17 for the 1st and the 2nd versions of Employment (F) Magnitude-Yerevan Marz.

Table 17. 1st and 2nd Versions of Decision Making (DM_i) Computation for Employment (F)

1st Version Magnitude (Category) No.	Name	Range	DM_i	2nd Version Magnitude (Category) No.	Name	Range	DM_i
F_{11}	Structure	3	6.5	F_{21}	Jobseekers	3	10.33
F_{12}	Legislation	4	4.5	F_{22}	Employers	4	10
F_{13}	Membership	6	3.5	F_{23}	Programs	2	11.5
F_{14}	Publication	5	3.5	F_{24}	Labour Market	5	7.8
F_{15}	Announcements / News	1	21.5	F_{25}	International Cooperation	6	7.67
F_{16}	Informative Contacts	2	9.5	F_{26}	Analyses and Researches	1	22.75

Source: Petrosyan (2016)

4.4.3 Constructions of Operation Research Approaches as Transportation Problem for Employment (F) Magnitude

An appealing approach is originated from the paper of Petrosyan (2016) and the book of Gupta & Cozzolino (1975). Data sets are displayed by Origins as numbers of existing indicators and Destinations as active categories of Employment (F) Magnitude. Data sets are conserved as per preliminary order, obtained from Table 16 and expressed in Table 18.

Another attractive approach is characterized in Table 19 through data sets representation with Origins as numbers of existing indicators and Destinations as active categories of Employment (F) Magnitude. Data sets are exhibited as per created order of Table 17, acquired from Table 16 and conveyed in Table 19.

Table 18. Data Sets with Origins & Destinations as per Preliminary Order for Employment (F)

		Origins F_1		Origins F_2		Demand
Destinations	1	13	2	62	6	8
	2	9	2	9	1	3
	3	7	2	57	2	4
	4	7	2	39	5	7
	5	43	2	23	3	5
	6	38	4	91	4	8
Supply			14		21	

Source: < http://redfame.com/> own case study

Table 19. Data Sets with Origins and Destinations as per Created Order for Employment (F)

		Origins F_1		Origins F_2		Demand
Destinations	1	43	2	91	4	6
	2	38	4	57	2	6
	3	13	2	62	6	8
	4	9	2	9	1	3
	5	7	2	39	5	7
	6	7	2	23	3	5
Supply			14		21	

Source: < http://redfame.com/> own case study

5. Actualization

5.1 Matrix Representations

The book of Gupta & Cozzolino (1975) defines the steps in the depiction of transportation problem. Data sets are recaptured from the paper of Petrosyan (2016) through implementation of operation research approaches to the characterized ACASP. The sequences of Education (S_3), Economy (E_5), Air (N_3)-Land (N_1) and Employment (F) representatives are derived in Table 20 and Table 21. Origins and destinations are computed by (3), (4) and (5), while transformation of indicators, categories and magnitudes are correspondingly interrelated to supply and demand applications with matrix illustrations of transportation assignments.

Table 20. Matrix through Origins & Destinations with Supply & Demand

Sequence	**1**		**2**		**3**		**4**		**5**		**6**	
S_{31}		5		9		3		6		1		5
	300		189		50		140		7		89	
S_{32}		4		4		2		4		3		4
	83		37		45		199		110		91	
E_{51}		4		6		4		6		8		4
	52		248		129		249		296		100	
E_{52}		6		3		9		2		6		4
	72		86		325		195		165		96	
N_{31}		3		8		3		3		4		5
	82		273		47		26		230		367	
N_{12}		2		6		4		8		3		4
	49		208		128		157		74		175	
F_1		2		2		2		2		2		2
	13		9		7		7		43		38	
F_2		6		1		2		5		3		4
	62		9		57		39		23		91	

Source: < http://redfame.com/> own case study

Table 21. Organized Matrix through Origins & Destinations with Supply & Demand

Sequence	**1**		**2**		**3**		**4**		**5**		**6**	
S_{31}		5		6		9		5		3		1
	300		140		189		89		50		7	
S_{32}		4		4		2		3		4		4
	199		9		45		110		83		37	
E_{51}		6		6		8		4		4		4
	249		248		296		129		100		52	
E_{52}		2		9		3		6		4		6
	195		325		86		165		96		72	
N_{31}		5		4		8		3		3		3
	367		230		273		82		47		26	
N_{12}		3		4		6		4		2		8
	74		175		208		128		49		157	
F_1		2		4		2		2		2		2
	43		38		13		9		7		7	
F_2		4		2		6		1		5		3
	91		57		62		9		39		23	

Source: < http://redfame.com/> own case study

5.2 North-West Corner Rule (NWCR)

Gupta and Cozzolino (1975) implied North-West Corner Rule (NWCR) in Tables 22 & 23. North-West Corner Rule (NWCR) is imposed through performance of three (3) main steps for solving the 1st order (Table 22) and the 2nd order (Table 23) matrices as:

Step 1: Choose the northwest corner cell; **Step 2:** Make the possible largest shipment;

Step 3: Regulate supply & requirement numbers. Go to Step 1 until the assignment is solved.

Table 22. 1st Order Matrix computation for North-West Corner Rule ($NWCR_1$)

Seq	**1**		**2**		**3**		**4**		**5**		**6**		**Supply**
S_{31}	29	5		9		3		6		1		5	29, 0
	300		189		50		140		7		89		
S_{32}	3	4	18	4		2		4		3		4	21, 18, 0
	83		37		45		199		110		91		
E_{51}		4	21	6	11	4		6		8		4	32, 11, 0
	52		248		129		249		296		100		
E_{52}		6		3	18	9	12	2		6		4	30, 12, 0
	72		86		325		195		165		96		
N_{31}		3		8		3	21	3	2	4		5	26, 2, 0
	82		273		47		26		230		367		
N_{12}		2		6		4		8	27	3		4	27, 0
	49		208		128		157		74		175		
F_1		2		2		2		2	1	2	13	2	14, 13, 0
	13		9		7		7		43		38		
F_2		6		1		2		5		3	21	4	21, 0
	62		9		57		39		23		91		
Dem	32, 3, 0		39, 21, 0		29, 18, 0		36, 24, 0		30, 28, 1, 0		34, 21, 0		

Source: < http://redfame.com/> own case study

Min $ZNWCR_1$ = 300*29 + 83*3 + 37*18 + 248*21 + 129*11 + 325*18 + 195*12 + 26*24 + 230*2 + 74*27 + 43*1 + 38*13 + 91*21 = 29962

Table 23. 2nd Order Organized Matrix computation for North-West Corner Rule ($NWCR_2$)

Seq	1		2		3		4		5		6		Supply
S_{31}	29	5		6		9		5		3		1	29, 0
	300		140		189		89		50		7		
S_{32}	3	4	18	4		2		3		4		4	21, 18, 0
	199		91		45		110		83		37		
E_{51}		6	21	6	11	8		4		4		4	32, 11, 0
	249		248		296		129		100		52		
E_{52}		2		9	18	3	12	6		4		6	30, 12, 0
	195		325		86		165		96		72		
N_{31}		5		4		8	24	3	2	3		3	26, 2, 0
	367		230		273		82		47		26		
N_{12}		3		4		6		4	27	2		8	27, 0
	74		175		208		128		49		157		
F_1		2		4		2		2	1	2	13	2	14, 13, 0
	43		38		13		9		7		7		
F_2		4		2		6		1		5	21	3	21, 0
	91		57		62		9		39		23		
Dem	32, 3, 0		39, 21, 0		29, 18, 0		36, 24, 0		30, 28, 1, 0		34, 21, 0		

Source: < http://redfame.com/> own case study

Min $ZNWCR_2$ = 300*29 + 199*3 + 91*18 + 248*21 + 296*11 + 86*18 + 165*12 + 82*24 + 47*2 + 49*27 + 7*1 + 7*13 + 23*21 = 26893

5.3 Low Cost Cell Rule (LCCR)

Gupta and Cozzolino (1975) follows three (3) key steps through implementation of Low Cost Cell Rule (LCCR) for solving the 1st order (Table 24) and 2nd order (Table 25) matrices as:

Step 1: Pick the cell with the lowest unit cost; **Step 2:** Make the possible largest shipment;

Step 3: Regulate supply & requirement numbers. Go to Step 1 until the assignment is solved.

Table 24. 1st Order Matrix computation for Low Cost Cell Rule ($LCCR_1$)

Seq	1		2		3		4		5		6		Supply
S_{31}	18	5	11	9		3		6		1		5	29, 110
	300		189		50		140		7		89		
S_{32}		4	21	4		2		4		3		4	21, 0
	83		37		45		199		110		91		
E_{51}		4	7	6	8	4	17	6		8		4	32, 25, 17, 0
	52		248		129		249		296		100		
E_{52}		6		3		9	19	2	11	6		4	30, 11, 0
	72		86		325		195		165		96		
N_{31}		3		8		3		3	19	4	7	5	26, 7, 0
	82		273		47		26		230		367		
N_{12}		2		6		4		8		3	27	4	27, 0
	49		208		128		157		74		175		
F_1	14	2		2		2		2		2		2	14, 0
	13		9		7		7		43		38		
F_2		6		1	21	2		5		3		4	21, 0
	62		9		57		39		23		91		
Dem	32, 18, 0		39, 28, 7		29, 8, 0		36, 19, 0		30, 19, 1, 0		34, 27, 0		

Source: < http://redfame.com/> own case study

Min $ZLCCR_1$ = 300*18 + 189*11 + 37*21 + 248*7 + 129*8 + 249*17 + 195*19 + 165*11 + 230*19 + 367*7 + 175*27 + 13*14 + 57*21 = 33820

Table 25. 2nd Order Organized Matrix computation for Low Cost Cell Rule ($LCCR_2$)

Seq	1		2		3		4		5		6		Supply
S_{31}	18	5	11	6		9		5		3		1	29, 11, 0
	300		140		189		89		50		7		
S_{32}		4	21	4		2		3		4		4	21, 0
	199		91		45		110		83		37		
E_{51}		6	7	6	8	8	17	4		4		4	32, 25, 17, 0
	249		248		296		129		100		52		
E_{52}		2		9		3	19	6	11	4		6	30, 11, 0
	195		325		86		165		96		72		
N_{31}		5		4		8		3	19	3	7	3	26, 7, 0
	367		230		273		82		47		26		
N_{12}		3		4		6		4		2	27	8	27, 0
	74		175		208		128		49		157		
F_1	14	2		4		2		2		2		2	14, 0
	43		38		13		9		7		7		
F_2		4		2	21	6		1		5		3	21, 0
	91		57		62		9		39		23		
Dem	32, 18, 0		39, 28, 7, 0		29, 8, 0		36, 19, 0		30, 19, 1, 0		34, 27, 0		

Source: < http://redfame.com/> own case study

Min ZLCCR2 = 300*18 + 140*11 + 91*21 + 248*7 + 296*8 + 129*17 + 165*19 + 96*11 + 47*19 + 26*7 + 27*157 + 43*13 + 62*21 = 26686

6. Discussion

An awesome approach is applied not only to decide the order of importance as per defined biodiversity concept, but also to represent decision making process as per operation research approaches, particularly transportation assignments through origins and destinations with supply and demand applications.

In order to decide the importance of the order for Education, Economy and Natural Protection Ministries, operation research methods are applied by the basic order, i.e. 1st order and complied order, i.e. 2nd order. The results of total costs (MinZ) are retrieved from Tables 22-25 and depicted in Table 26 through appliances of North-West Corner Rule (NWCR) and Low Cost Cell Rule (LCCR).

Table 26. 1st& 2nd order with implementation of NWCR & LCCR

MinZ	1st order	2nd order
North-West Corner Rule (NWCR)	29962	26893
Low Cost Cell Rule (LCCR)	33820	**26686**

Source: < http://redfame.com/> own case study

Petrosyan (2016) paper coincides with the current paper and provides the specified sequences of RA ministerial distributions towards improvements of employment within Armenian Composite Appraising Supportive Progress (ACASP).

7. Conclusion

Petorsyan (2014, 2010) describes Sustainable Development as an innovative concept viewed as Composite Appraising Supportive Progress of Armenia (ACASP). Biodiversity concept is an extra topic having an immense power on public management and employment. Techniques from old literature review of operation research studies (Gupta & Cozzolino, 1975) are implied on the modern concepts of CASP (Petrosyan, 2014, 2015a-c) because the literature gap existence is resolved combining main digested approaches.

A motivating approach is recounted not only to choose the order of significance as per biodiversity concept, but also to typify decision making process through operation research techniques, particularly transportation assignments as per origins and destinations with supply and demand applications. Social, economic and environmental impacts optimize sequences within Education (S_3), Economy (E_5), Air (N_3) & Land (N_1) Ministries. Seven (7) phases of Operation Research (OR) studies (Hillier & Liberman, 2001) are characterized through nine (9) procedures of composite progressive indicators - CPI (Petrosyan, 2015d & 2016).

Public Management is inspected in terms of Employment (F) as an executive impression of ACASP. Petrosyan (2014) demonstrates typical relations of three (3) biodiversity stages in Table 1. Proposed public management of ACASP is depicted in the papers of Petrosyan (2015 a, b, c & 2016) as per magnitudes, categories and indicators. North-West Corner Rule (NWCR) and Low Cost Cell Rule (LCCR) are applied to supervise the executive plan through Employment (F) performance in three (3) dimensional ways of Education (S_3), Economy (E_5) and Land (N_1)-Air (N_3) Magnitudes. Petrosyan (2016) and the current paper emphasize on sequences of the most imperative categories with the proposed model of ACASP as:

Genes: Society (S) Education (S_3): Legislations - International Cooperation

Species: Economy (E) Economy (E_5): Policy - Vacancies

Ecosystems:	Nature (N)	Air (N_3) & Land (N_1):	Publications - Informative
Functions:	ACASP	Employment (F):	Announcements-Analyses & Researches

Accompanying investigations are advised to lead improvements of Employment (F) magnitude towards combinations of the additional ministerial magnitudes for prescribed ACASP. Further research is required in public management to advance Armenian economy and to improve Employment (F) magnitude within proposed ACASP.

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