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The Methodology for Optimal Classification of Economies by Development Level of Manufacturing Industry: in Case of European countries

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ABSTRACT
This paper elucidates the methodology for classification of multidimensional observations, and elaborates the development indices of manufacturing industries of the European countries. According to this index the European countries are divided into lower, medium and higher classes. In addition, the paper determines the disposition of the countries to development in the groups classified by development index. The paper ends with the theoretical and empirical conclusions drawn as a result of research.

Keywords: cluster, set, metrics, multidimensional observation, Euclidean distance.
JEL classification: C02, C38, L60.

INTRODUCTION
Classification of multidimensional observations is a complex process which requires a lot of efforts and complex calculations. In turn, a classification is carried out by the use of cluster analysis methods. The main aim of clustering is to form similar groups between the objects and analyze interrelations between them.

The relevance of clustering is specified with the nature of practical problems which it can solve, and with its economically actuality. In our research we elucidate the issues of classification of multidimensional observations, according to which some European countries are divided into lower, medium and higher classes by their "development level of manufacturing industries". Classifying these countries by certain development level and identifying the regularity is an important issue where every country is characterized with a set of specific indicators. Therefore, it is impossible to classify them by the same level. This, in turn, puts forward the new scientific problems to the issue of classification of objects, and a special attention is paid to the solution of this issue in the research.

A need for scientific research to the proposed methodology is that there studied not only the issue of classification of objects but also the issue of determining a disposition of objects to development in classified groups.

For classification of objects, a parallel clustering method is used in the research. The idea of parallel cluster operations is that in each step of algorithm all the indicators are compared and calculated simultaneously. The main idea to develop different algorithms of parallel classification is to specify the method which provides a rapid solution of the objectives being set and reduces the options of selection.

2. Literature review
Although the first publications on cluster analysis started to emerge in late of 1930s of the last century, however, this method actively developed at
the end of 1960s and beginning of 1970s (Soshnikova, Tamashevic, Uebe and Shefer, 1999). Later on, as a result of development of the information technologies there appeared new methods, modifications and algorithms of clustering, and emerged opportunities to massively process the labor-intensive and large-scale data (Everitt, Landau, Leese, et al., 2011).

A specific aspect of cluster analysis is that it is a common research method for almost all sciences. At present, this method is being widely used in medical science to classify the organisms and determine the hereditary diseases, in chemistry to classify the similar properties of a substance, and in environmental science to classify the changes and processes of the nature (Greenacre and Primicerio, 2013).

As theoretical analyses show that in many scientific sources the hierarchical, parallel and sequence clustering operations have been widely investigated (Rencher, 2002; Manly, 2005).

In scientific literature related to theoretical aspects of our research there have been investigated the issues such as clustering methods and their specific features, problems of interpretation and clustering of the results of cluster analysis (Yegorova and Khachatrian, et al., 2001; Milligan and Cooper, 1987), clustering methods and algorithms, particularly issues of clustering in conditions of uncertainty (Jain, Murty and Flynn, 1996), selection of variables and measuring the distance between objects and the issues of evaluation of a quality of clustering (Qin, 1999), problems emerging with optimal grouping of objects and alternative algorithms serving for overcoming these problems (Vakharia and Mahajan, 2000), hierarchical and nonhierarchical methods of cluster analysis and optimization of a number of clusters (Cornish, 2007), as well as contemporary and classical approaches to cluster analysis, specifically problem statement and algorithms of cluster analysis in conditions of uncertainty (Řezanková, 2014).

In scientific literature (Šipilova, 2015) directly related to practical aspects of our research there have been investigated the issue of classification of European countries by structural changes in industrial production.

Compared to researches mentioned above, our research has two specific aspects. Firstly, in our research we consider not only the issue of classification of objects but the issue of determining their disposition to development in classified groups. Secondly, a classification algorithm enabling “transferring the objects from class to class” is used in our classification issue.

3. Statistical data

The annual reports of the United Nations Industrial Development Organization (Industrial Development Report, 2013 and 2016) serve as the information base of the research.

The statistical data covers the period from 2006 to 2013. Single development indicators of manufacturing industry of 20 European countries are chosen in this research.

4. Methodology

When classifying the countries by development level of manufacturing industry we primarily choose 6 most important economic indicators, and then generate private indicators out of them. These indicators not only characterize the development level of manufacturing industry in the country but also specify the countries’ position of economic development on this sector in the world.

4.1. Formulation of private indicators and the options for calculation of generalized indicators

For classification of countries by development level of manufacturing industry, we initially introduce the following indications:

\[ q_i^t \] - added value of manufacturing industry of \( i \) country in \( t \) period;

\[ gdp_i^t \] - GDP of \( i \) country in \( t \) period;
\( qe_i^t \) - export of manufactured industrial products of \( i \) country in \( t \) period;
\( te_i^t \) - total volume of export of \( i \) country in \( t \) period;
\( wq^t \) - added value of the world manufacturing industry in \( t \) period;
\( wqe^t \) - volume of export of the world manufactured industrial products in \( t \) period.

On the basis of initial indications given above we formulate the following private indicators:

\[
\begin{align*}
    z_{i,1}^t &= \frac{qe_i^t}{gdp_i^t} & \text{share of added value of manufacturing industry in the GDP of } i \text{ country in } t \text{ period;} \\
    z_{i,2}^t &= \frac{qe_i^t}{te_i^t} & \text{share of export of manufactured industrial products in the total volume of export of } i \text{ country in } t \text{ period;} \\
    z_{i,3}^t &= \frac{qe_i^t}{wq^t} & \text{share of } i \text{ country in added value of the world manufacturing industry in } t \text{ period} \\
    z_{i,4}^t &= \frac{qe_i^t}{wqe^t} & \text{share of } i \text{ country in a volume of export of the world manufactured industrial products in } t \text{ period, } i = 1,2,...,n
\end{align*}
\]

The following vector expressing the development of countries’ manufacturing industry in \( t \) period is formulated from the private indicators:

\[
Z_i^t = \left( z_{i,\rho}^t \right)_{\rho=1,2,3,4}, \quad i = 1,2,...,n. \tag{1}
\]

The following matrix is generated from (1) which expresses the development of countries’ manufacturing industry and is called “Object-property”.

\[
Z_i^t = \begin{pmatrix}
    z_{1,1}^t & z_{1,2}^t & z_{1,3}^t & z_{1,4}^t \\
    z_{2,1}^t & z_{2,2}^t & z_{2,3}^t & z_{2,4}^t \\
    z_{3,1}^t & z_{3,2}^t & z_{3,3}^t & z_{3,4}^t \\
    \vdots & \vdots & \vdots & \vdots \\
    z_{n,1}^t & z_{n,2}^t & z_{n,3}^t & z_{n,4}^t
\end{pmatrix} , \tag{2}
\]

where \( z_{i,\rho}^t \) - indicator expressing the development of manufacturing industry of \( i \) country in \( t \) period, \( \rho = 1,2,3,4 \).

If \( Z_i^t \) matrix is reviewed in \( t = 1,2,...,T \) moments then there appeared periodical spatial indicators which include the development of countries’ manufacturing industries.

Thus, we divide a set of countries \( O = \{O_i, i = 1,2,...,n\} \) into 3 classes \( S^u = \{S^u_1, S^u_2, S^u_3\} \) through vectors of periodical spatial indicators \( Z_i^t = \left( Z_{i,\rho}^t \right)_{\rho=1,2,3,4}, i = 1,2,...,n \) characterizing the development of manufacturing industry of \( i \) country in \( t \) period. In that case, \( S^u_1, S^u_2 \) and \( S^u_3 \) are a set of classes which include the group of countries with respectively “lower”, “medium” and “higher” development levels of manufacturing industry.
In this case, the countries belonging to \((S^u_i)\) class are characterized with lower impact of their manufacturing industry on development of the world economy. And the countries belonging to second \((S^u_2)\) and third \((S^u_3)\) classes are characterized with respectively “medium” and “higher” impact on the entire world economy. Also,

\[ i \neq j \text{ for } S_i \cap S_j = \emptyset \]
\[ \bigcup_{i=1}^{k} S_i = \{i, i = 1, 2, ..., n\}, \tag{3} \]

where \(k\) - number of classes.

The integral indicator of development of the countries’ manufacturing industries should have an aggregate character and be a sum of vector private indicators for the all \(i = 1, 2, ..., n\).

All the private indicators are close or similar to each other in their economic nature and formation. When the possible values for the all \(i\) and \(\rho\) would change in the single interval \(0 < Z^t_{i,\rho} < 1\), then for formulation of generalized indicator a separate measurement of private indicators may be applied.

Thus, for dividing into initial classes we accept the generalized indicator \((\omega^t_i)\) expressing the development of manufacturing industry of \(i\) country in \(t\) period, and consider the order and options for its calculation.

The order and options for calculation of generalized indicators expressing the development of countries’ manufacturing industries are as follows:

1. All the private indicators have equal values, i.e. their shares are the same. In this case, the generalized indicator expressing the development of manufacturing industry of \(i\) country in \(t\) period would be equal to the following:

   \[ \omega^t_i = \frac{1}{4} \sum_{j=1}^{4} z^t_{i,j}, i = 1, 2, ..., n. \tag{4} \]

2. For the all \(Z^t_{i,j}\) private indicators a share of significance \(\lambda_i\) has different values, in that case the generalized indicator would be equal to the following:

   \[ \omega^t_i = \sum_{j=1}^{4} \lambda_i z^t_{i,j}, i = 1, 2, ..., n. \tag{5} \]

3. If a share of significance of private indicators characterizing the development of country’s manufacturing industry is \(\lambda_i\), and if a share of significance of private indicators characterizing the position of this country on this sector in the world is \(1 - \lambda_i\), then an aggregate indicator is calculated as follows:

   \[ \omega^t_i = \lambda_i \frac{1}{2} (z^t_{i,1} + z^t_{i,2}) + (1 - \lambda_i) \frac{1}{2} (z^t_{i,3} + z^t_{i,4}), i = 1, 2, ..., n. \tag{6} \]

where selection of \(\lambda_i\) is carried out by the method of expert evaluation.
4.2 Methods of dividing into classes and selection criterion of appropriate metrics

There are plenty of methods of dividing the given set of countries \( O = \{ O_i, i = 1,2,\ldots,n \} \) into classes, and we introduce a magnitude \( Q(S) \) as a selection criterion of the best among them. The magnitude \( Q(S) \) is determined by finding a distance \( d(Z'_i, Z'_j) \) between vector indicators \( Z'_i \) and \( Z'_j \) characterizing the development of manufacturing industries of \( i \) and \( j \) countries, and \( O_i \in O - d(O_i,O_j) \).

There are various dimensions characterizing the distance between signs of objects where we can include Euclidean distance, Mahalanobis metrics, Hamming distance and Canberra metrics.

As the indicators of \( Z'_{i,\rho}, i = 1,2,\ldots,n \) vectors in our process are the same by its economic nature and calculation method, it is reasonable to use ordinary Euclidean distance for measuring the distance given:

\[
d_e(Z'_i, Z'_j) = \sqrt{\sum_{\rho=1}^{4} (z'_{i,\rho} - z'_{j,\rho})^2} \tag{7}
\]

If development of manufacturing industry has been implemented with pursuing some specific intents and its position has been formed by expert method, then it is reasonable to use weighted Euclidean distance:

\[
d_{we}(Z'_i, Z'_j) = \sqrt{\sum_{\rho=1}^{4} \lambda_{\rho} (z'_{i,\rho} - z'_{j,\rho})^2} \tag{8}
\]

where \( 0 \leq \lambda_{\rho} \leq 1, \rho = 1,2,3,4 \).

After selection of appropriate metrics, we carry out clustering by means of parallel cluster operation. The idea of this cluster operation is that it compares and calculates all indicators simultaneously at each step of algorithm.

To divide the countries into classes by development level of manufacturing industry we use algorithm which enables sequential “transferring the objects from class to class”. As the development indicator \( z'_{i,\rho} \) of a certain country after a definite time can transfer from one development state to another.

As researches show, while dividing the set into classes usually one of the widespread ideas is applied in the algorithms of cluster analysis:

1. Optimizing the division into classes by means of quality functional for initially selected classes.
2. Making clusters on the basis of a principle of detecting the most concentrated positions of indicators in four-dimensional space of the indicators to be considered.

Thus, when dividing a set of countries \( O = \{ O_i, i = 1,2,\ldots,n \} \) into three classes \( S^u = \{ S^u_1, S^u_2, S^u_3 \} \) in \( t \) period it is possible to carry out initial dividing \( S^0 \) in 2 options by means of generalized indicator \( \{ \omega'_{i,\rho}, i = 1,2,\ldots,n \} \) formulated above (in case of symmetrical and asymmetrical distribution of aggregate indicators).

4.3. Algorithm for initial division when aggregate indicators are symmetrically distributed

First of all, we range the generalized indicators:

\[
\omega'_{i_1} \leq \omega'_{i_2} \leq \omega'_{i_3} \leq \ldots \leq \omega'_{i_n}. \tag{9}
\]
Later on, we divide the range of all possible changes of the aggregate indicators into 3 intervals:

$$\left[ \omega^i_h, \omega^i_h + \frac{\omega^i_u - \omega^i_h}{3} \right), \left[ \omega^i_h + \frac{\omega^i_u - \omega^i_h}{3}, \omega^i_h + \frac{2}{3} \left( \omega^i_u - \omega^i_h \right) \right), \left[ \omega^i_h + \frac{2}{3} \left( \omega^i_u - \omega^i_h \right), \omega^i_n \right]$$ (10)

If \( i = \max \arg \omega^i \), then:

$$\omega^i_i \in \left[ \omega^i_h, \omega^i_h + \frac{\omega^i_u - \omega^i_h}{3} + \omega^i_h \right), \omega^i_{h+i} \notin \left[ \omega^i_h + \frac{\omega^i_u - \omega^i_h}{3}, \omega^i_h + \frac{2}{3} \left( \omega^i_u - \omega^i_h \right) \right)$$ (11)

Hence it appears \( S^0_i = \{ i_1, i_2, ..., i_l \} \).

If \( i_q = \max \arg \omega^i \), then:

$$\omega^i_q \in \left[ \omega^i_h + \frac{\omega^i_u - \omega^i_h}{3}, \omega^i_h + \frac{2}{3} \left( \omega^i_u - \omega^i_h \right) \right) i.e. \omega^i_{q+i} \notin \left[ \omega^i_h + \frac{\omega^i_u - \omega^i_h}{3}, \omega^i_h + \frac{2}{3} \left( \omega^i_u - \omega^i_h \right) \right)$$ (12)

Hence it appears \( S^0_2 = \{ i_{q+1}, ..., i_n \} \). From formulation above \( S^0_3 \) class is determined automatically:

\( S^0_3 = \{ q_{i+1}, ..., i_n \} \)

4.4. Algorithm for initial division when aggregate indicators are asymmetrically distributed

This algorithm is based on determining the mode in discrete series \( \{ \omega^i, i = 1, 2, ..., n \} - \omega^i_{\text{mod}} \). Then, \( i \) number comes from the following condition:

$$\omega^i_i \leq \omega^i_{\text{mod}}, \text{ but } \omega^i_{i+1} > \omega^i_{\text{mod}}$$ (13)

then, it appears \( S^0_1 = \{ i_1, i_2, ..., i_l \} \), afterwards \( i_q \) is determined from the following condition:

$$\omega^i_q \leq \overline{\omega^i}, \text{ but } \omega^i_{q+1} > \overline{\omega^i}$$ (14)

where \( \overline{\omega^i} \) is a mean value for \( \omega^i, i = 1, 2, ..., n \).

We have to remind that \( \omega^i_{\text{mod}} \) is value of a sign mostly found in the set, and it expresses the mostly repeatable option in a given option \( \{ \omega^i, i = 1, 2, ..., n \} \). Also, if we see the discrete series with equal intervals, then \( \omega^i_{\text{mod}} \) intra-modal interval is determined with the following interval:

$$\omega^i_{\text{mod}} = \omega^i_{\text{mod-min}} + k \left( \frac{\omega^i_{\text{mod}} - \omega^i_{\text{mod-1}}}{\omega^i_{\text{mod}} - \omega^i_{\text{mod-1}}} + \omega^i_{\text{mod}} - \omega^i_{\text{mod+1}} \right)$$ (15)
where \( \omega^t_{\text{mod} \min} \) - lower limit of modal interval; \( k \) - magnitude of interval; \( \omega^t_{\text{mod}} \) - frequency of modal interval; \( \omega^t_{\text{mod} - 1} \) - frequency of modal interval relating to previous modal interval; \( \omega^t_{\text{mod} + 1} \) - frequency of modal interval relating to next modal interval.

Thus, it appears respectively \( S_0 = \{i_{p+1}, i_{p+2}, \ldots, i_{q}\} \) and \( S_0 = \{i_{q+1}, i_{q+2}, \ldots, i_{n}\} \). For the types of asymmetrical distribution the empirical density of \( f(\omega^t) \) distribution would have the following appearance (Figure 1):

As it is seen from the empirical distribution function, \( S_0 \) aggregate indicators express the number of countries located in \( [\omega^t_{\text{mod}}, \omega^t_{\text{mod}}] \) interval, \( S_2 \) aggregate indicators express the number of countries located in \( [\omega^t_{\text{mod}}, \overline{\omega^t}] \) interval, and \( S_3 \) aggregate indicators express the number of countries located in \( [\overline{\omega^t}, \omega^t_{\text{mod}}] \) interval.

![Figure 1. Approximate theoretical view of empiric distribution of the aggregate indicators of development of manufacturing industry](image)

4.5. End of quality criterion and algorithm for dividing into classes

After \( S_0 \) initial dividing option is selected, \( Q(S_0) \) value of quality criterion for dividing is determined. In the number of classes given, the quality of dividing is composed of a sum of intra-class dispersions:

\[
Q(S) = \sum_{k=1}^{3} \sum_{i=1}^{n} d^2(Z_i^t, \overline{Z}_k^t),
\]

where \( d^2(Z_i^t, \overline{Z}_k^t) \) - squared distance on Euclidean metrics (or weighted Euclidean metrics); \( S_0^k \) - dividing into \( k \) classes where a number of classes are strictly constant and it equals to 3 \( \left(k = 1, 2, 3\right) \).

\( \overline{Z}_k^t \) - vector of mean values for \( k \) class: \( \overline{Z}_k^t = (\overline{Z}_{k,1}^t, \overline{Z}_{k,2}^t, \overline{Z}_{k,3}^t, \overline{Z}_{k,4}^t) \)
\[ \bar{z}_{k,\rho}^i = \sum_{i \in S_k^0} x_{i,\rho}^{a} \quad \dim S_k^0, \quad \rho = 1, 2, 3, 4, \ldots, k = 1, 2, 3. \]  

(17)

\( z_{i,j} \) - components of \( Z_i^j \) vector; \( \dim S_k^0 \) - dimension of \( S_k^0 \) set.

Inner sum in \( Q(S) \) is taken across the points of \( i \) country which correspond respectively to \( S_k^0 \), \( S_k^2 \) and \( S_k^3 \) classes. Further, every \( Z_i^j \) points move across the all clusters by turn, and stand in the position suitable to the best (minimal) value of \( Q(S) \) function. When movement of \( Z_i^j \) does not result in improvement of quality of division into groups, the algorithm will end (if a sum of values of intra-class dispersion is minimized).

The following condition can be taken as an end condition of algorithm: if \( Q(S^m) \) and \( Q(S^{m+1}) \), \( m \) and \( m+1 \) are the functional values in sequential steps, then \( S^m = \{S_1^m, S_2^m, S_3^m\}, S^{m+1} = \{S_1^{m+1}, S_2^{m+1}, S_3^{m+1}\} \) are the classes taken in these steps. If the following condition is fulfilled for \( \varepsilon > 0 \) (\( \varepsilon \) - clarity of calculation), then the process of dividing into classes stops:

\[ |Q(S^m) - Q(S^{m+1})| < \varepsilon \]  

(18)

As a result of classification carried out we take \( S^{m+1} \) division and assign it with \( S_i^j \). It should be stated that \( Q(S) \) sequence is monotone decreasing: created algorithm \( Q(S^0) < Q(S^1) < \ldots < Q(S^{m+1}) \) is used in regard to the identically same set repeatedly; after various divisions \( \{Z_i^j, i = 1, 2, \ldots, n\} \) and \( S^0 \), finally the best option of \( Q(S) \) is generated.

4.6. Formation of sustainable localization zones by development level of manufacturing industry

According to algorithm above, for each \( t \) period \( i = 1, 2, \ldots, n \) a set of countries can be divided into 3 classes \( S_i^j = \{S_1^j, S_2^j, S_3^j\} \) by development level of manufacturing industry.

If we possess an observational statistics \( (t_0 - N + 1, t_0 - N + 2, \ldots, t_0 \) period, where \( t_0 \) is a base year) on development level of manufacturing industry in a cross section of countries and economy of countries in \( N \) length \( (N \) - retrospective length), then proposed algorithm would make it possible to create a group of divisions into classes \( O = \{O_i^j, i = 1, 2, \ldots, n\} \) for each \( t \) from the retrospective period \( \{S_i^j, t \in [t_0 - N + 1, t_0]\} \).

Using the theoretical operations of set calculation we can generate the following:

\[ S_k = \bigcap_{t=t_0-N+1}^{t_0} S_k^j, \quad k = 1, 2, 3 \]  

(19)

where \( S_i^j \) - a set of countries whose development of manufacturing industry is characterized with stable lower rates and which maintain such dynamics during the whole retrospective period.
\( S_2, S_3 \) - a set of countries whose development of manufacturing industry is characterized with medium and higher rates respectively and which maintain such dynamics during period analyzed. In this case, \( S_k, k = 1, 2, 3 \) can be called as stable zones for various development of manufacturing industry in a cross section of countries.

It is to say that in a set of countries \( \widetilde{S} = \left\{ i, i \in S / \bigcup_{k=1}^{3} S_k \right\} \) the development of manufacturing industry has changeable ad unstable dynamics. Therefore, \( \widetilde{S} \) set can be called as a sphere of unstable development of manufacturing industry in a cross section of countries. These countries “move” from class to class during retrospective period. Movement of each \( i \) country \( k(i') = \arg S_k^i \) can be determined from \( i' \in S_k^i \) condition.

\[
K_i^t = \left\{ k(i'), [t \in t_0 - N + 1, t_0] \right\}. \tag{20}
\]

where \( K_i \) determines the sequence of “movements” of \( i \) country during retrospective period of ordered set. It is to note that if for the all \( [t \in t_0 - N + 1, t_0] \) it appears:

\[
K_i^t = \{ k(i) = \text{const} = k \} \tag{21}
\]

then, the elements of a sequence retain the constant value, and thus, from (19) it appears \( i \in S_k \).

### 4.7. Algorithm for determining the disposition to development in classified groups by development level of manufacturing industries of the European countries

To analyze the “moving” actions of \( i \) country across classes within the retrospective period we use (20) relationship. We assign the set with \( K_i^t(l) \):

\[
K_i^t(l) = \left\{ k(i') = l, t \in [t_0 - N + 1, t_0] \right\}, \ l = 1, 2, 3. \tag{22}
\]

In this case, a number of movements of \( i \) country to \( l \) class would serve as characteristics expressing the disposition of manufacturing industry of \( i \) country to \( l \) types of development.

\[
N_i(l) = \dim K_i^t(l), \ l = 1, 2, 3, \ i = 1, 2, ..., n. \tag{23}
\]

The average time for \( i \) country to be in \( l \) class would serve as characteristics expressing the disposition of manufacturing industry of \( i \) country to \( l \) types of development.

\[
T_i(l) = \frac{N_i(l)}{N}, \ l = 1, 2, 3, \ i = 1, 2, ..., n. \tag{24}
\]

It should be noted that

\[
\sum_{l=1}^{3} T_i(l) = \frac{1}{N} \sum_{l=1}^{3} N_i(l) = 1 \tag{25}
\]
This is of significant importance to observe the movement of a set of countries across classes \( G \subseteq S \) and the development of their manufacturing industries. For example, \( G \) is a set of countries with sustainable development of manufacturing industry. Belonging to certain groups for these countries is considered with inclusion of their shares. In that case, “moving” of \( G \) set across classes during retrospective period can be observed by operations of the following theoretical set.

\[
G_1 = G \cap S_1, \quad G_2 = G \cap S_2, \quad G_3 = G \cap S_3,
\]

where \( G_1, G_2, G_3 \) - small sets of \( G \) set where sustainability of development of manufacturing industry is supported.

\[
G_4 = G \setminus \bigcup_{k=1}^{3} G_k = G \setminus \bigcup_{k=1}^{3}(G \cap S_k)
\]

In the sets above there observed the unsustainable development of manufacturing industry. The movements of separate countries \( i \in G_4 \) from class to class can be observed in relationship similar to (20): dynamics and character of movements of \( i \in G_4 \) countries can be analyzed on the basis of (22) - (25) relationships.

5. Empirical results

The empirical results obtained on the basis of proposed methodology are shown in Table 1. As per analyses, during 2006-2013 Norway is included in the first group \((S_1^u)\) of countries with lower development level of manufacturing industry (Norway’s mean value of development index was 8.63 during 2006-2013), and Austria is included in this group with 13.41 value in 2006 and 7.25 value in 2011.

| Development indices of manufacturing industries of the European countries (in percent) |
|-------------------|-----------------|-----------------|-----------------|-----------------|
| Austria           | 13.41           | 26.83           | 7.25            | 27.25           |
| Belgium           | 26.83           | 25.41           | 26.35           | 25.90           |
| Bulgaria          | 22.27           | 21.90           | 21.24           | 21.78           |
| Czech Rep.        | 29.52           | 29.88           | 30.36           | 30.99           |
| Finland           | 28.91           | 28.66           | 27.94           | 26.83           |
| France            | 27.16           | 24.80           | 26.25           | 26.02           |
| Germany           | 32.68           | 26.97           | 31.13           | 31.51           |
| Greece            | 21.13           | 21.38           | 21.75           | 22.23           |
| Hungary           | 27.32           | 26.68           | 27.53           | 27.76           |
| Ireland           | 28.38           | 27.10           | 30.22           | 27.25           |
| Italy             | 29.37           | 27.00           | 28.08           | 28.24           |
| Netherlands       | 23.17           | 21.26           | 25.74           | 24.54           |

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The second group ($S_2^u$) of countries with medium development level of manufacturing industry included Greece and Bulgaria during 2006-2013 as well as the Netherlands in 2006 and 2008. Particularly, for the Netherlands this index made up 23.17 value in 2006 and 21.26 value in 2008.

As the analyses show that majority of European countries belong to the third group ($S_3^u$) of countries with higher development level of manufacturing industry.

The disposition of the European countries to development in classified groups by development levels of manufacturing industries is shown in Table 2.

### Table 2

**Disposition of the European countries to development in classified groups by development level of manufacturing industry** (in coefficient)

<table>
<thead>
<tr>
<th>Country</th>
<th>$S_1^u$ - group</th>
<th>$S_2^u$ - group</th>
<th>$S_3^u$ - group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>0.5</td>
<td>0</td>
<td>0.5</td>
</tr>
<tr>
<td>Belgium</td>
<td>0</td>
<td>0</td>
<td>1.0</td>
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<tr>
<td>Bulgaria</td>
<td>0</td>
<td>1.0</td>
<td>0</td>
</tr>
<tr>
<td>Czech Rep.</td>
<td>0</td>
<td>0</td>
<td>1.0</td>
</tr>
<tr>
<td>Finland</td>
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<td>0</td>
<td>1.0</td>
</tr>
<tr>
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<td>1.0</td>
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</tr>
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<td>1.0</td>
</tr>
<tr>
<td>Country</td>
<td>$S_1^u$ - group</td>
<td>$S_2^u$ - group</td>
<td>$S_3^u$ - group</td>
</tr>
<tr>
<td>-------------</td>
<td>----------------</td>
<td>----------------</td>
<td>----------------</td>
</tr>
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</tr>
<tr>
<td>Switzerland</td>
<td>0</td>
<td>0</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Source: Author’s calculations.

As per analyses, during 2006-2013 Norway’s manufacturing industry disposes to development with 100 percent probability as well as Austria’s manufacturing industry disposes development with 50 percent probability in the first group. Bulgaria’s and Greece’s manufacturing industries dispose to development with 100 percent probability as well as the Netherlands’ manufacturing industry dispose to development with 50 percent probability in the second group. All the rest of European countries’ manufacturing industries dispose to development with 100 percent probability in the third group.

6. Conclusion

1. The empirical results obtained in the course of research enable to work out specific strategy for long-term economic development of manufacturing industry of the countries with various development tendencies, to identify countries with active and weak development level of manufacturing industry and to find out the reasons for it.

2. On the basis of research there worked out the development indices (DI) of manufacturing industries of the European countries according to which this index changes in $0 \leq DI \leq 100$ interval. Approximation of a value of this index to 100 testifies to the effect that manufacturing industries of the countries are being developed.

3. According to empirical results obtained, Norway’s manufacturing industry disposes to development with 100 percent probability, Austria’s manufacturing industry disposes to development with 50 percent probability in lower level; Bulgaria’s and Greece’s manufacturing industries dispose to development with 100 percent probability and the Netherlands’ manufacturing industry disposes to development with 50 percent probability in medium level; and all the rest of European countries’ manufacturing industries dispose to development with 100 percent probability in higher level.

References


वैदिक नीतिशास्त्र में ऋतू की अवधारणा

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सारांश

सम्पूर्ण भारतीय नीतिशास्त्र ‘ऋतू’ या कर्मवाद के सिद्धांत को स्वीकार करता है। चार्वा दर्शन को छोड़कर जैन, बौद्ध आदि अवैदिक परम्परायें भी कर्मवाद के सिद्धांत के आधार पर कर्मनुसार फलानुसार कि हेतु-युग के मध्यार्थ को स्वीकार करती है। हिन्दू नीतिशास्त्र वेदों पर आधारित है। अतः वैदिक ऋतू की अवधारणा हिन्दू नीतिशास्त्र स्वीकार करते हैं। ऋतू का शाष्किक अर्थ घटनाओं का गतिक्रम है। प्राकृतिक और नैतिक घटनाओं का गतिक्रम ऋतू से संबंधित होता है। ऋतू का मूल आचार प्रक्रिया की रूपरेखा तथा वस्तुओं की व्यवस्था से है। ऋतू वह अप्रत्यावतरीय नियम है जो संसार के प्रत्येक परिवर्तन की पृथ्वमूली में कार्यरत है। मनुष्य के श्रेष्ठ आचरण के लिए भी ऋतू के नियम कार्य करते हैं।

प्रस्तावना—

परिचय— वेद शब्द ‘विद्वंसात्यामं विद्वज्ञानं’ विद्विज्ञान की एक विद्विज्ञान को स्थापित करता है। वेद शास्त्र शास्त्र के अनुसार, वेद अविभाज्य हैं— परंतु वेद शास्त्र ने स्थायी लोकहिताय वेदों की रचना की है। वेद भारतीय संस्कृति के प्रारंभिक लिखित शास्त्र है। वेदों की श्रद्धा विश्वभर में है। वेदों का मूल अर्थ श्रद्धा है। इसलिए सभी विश्वासों में वेद शास्त्र का प्रमुख श्रद्धा भारत है। वेद शास्त्र का निर्देशन है। मनुष्य जाति के प्रारंभिक इतिहास, सामाजिक नियम, अर्थ धर्म, सोचना, कला, संस्कृति, लय, सत्य आदि का ज्ञान प्राप्त करने का एकमात्र साधन तथा है। वेद के अन्तिम तथा मोक्षप्राप्ति हैं। ईश्वरपूजन, योगप्रौढ़, धर्मनुत्सर, विद्या-प्राप्ति, साधनाप्राप्ति, आदि मोक्षप्राप्ति के उपाय वेदों में बताये गए हैं। कर्मवाद के प्राप्ति के लिए पुनर्जन्त्रण का प्रतिपादन, आलोचनातिक के लिए संस्कृति का निर्माण, समृद्धि जीवनप्रबंधन के लिए आर्थिक व्यवस्था तथा जीवन के परिवर्तन के लिए मनुष्यस्वरूप का निर्माण करना आदि वेदों की मूख्य विशेषता है। वेद चार हैं— ऋतू, यज्ञ, अध्याय और अध्यायवेद। ऋतू में स्तुति, यज्ञ, समाधि और अध्यायवेद। ऋतू अध्याय, समाधि अध्याय, अध्याय में शास्त्र, राज्य शासन, तत्त्व-प्रतीतिपाद विश्वास है। वेद एक लाख में है। 80 हज़ार एक हज़ार कर्मस्थल का निर्माण करते हैं। 16 हज़ार ज्ञानविज्ञान का तथा 4 हज़ार एक उपाधि कर्मक्रमों के हैं। ऋतू के अध्याय की परम्परा पैलेट्रीशिया से प्रारम्भ हुई। 9 वज्ञायन, 8 अध्याय, 10 मुख्य, 2006 वर्ग, 1000 सूक्त, 85 अनुक्रम तथा 10,440 मंत्र है। ऋतू के की 21 शास्त्र है। इसके 2 दो धर्म हैं— शुकु यज्ञवेद और क्रृष्ण यज्ञवेद। शुकु यज्ञवेद की 15 संहिताएँ है। इनमें वाजसंती और कर्मव, दो संहिताएँ उपलब्ध हैं। क्रृष्ण यज्ञवेद की 86 संहिताएँ हैं, इनमें चार तत्त्वे, तत्त्वव्यव, कर्म और क्रियात्मक संहिताएँ उपलब्ध हैं। अध्याय शास्त्र के 1000 संहिताएँ हैं, जिनमें कॉयुक और जैनियों के 50 शास्त्र उपलब्ध हैं। राजनीतिक की गोवित्त पहली तत्त्वीय है। अध्याय की 9 शास्त्र हैं, जिनमें शक्ति और पैलेट्रीकर्म का अध्यायकर्मवेद चार अध्यायवेद, विनिय वेद तथा श्रीराज्य के नाम से भी जाना जाता है। अध्यायवेद में 20 काण्ड, 730 सूक्त, 36 प्राप्तिक और 5987 मंत्र हैं। भारतीय कला से ऋतु, महाशिव आचार विषय भारतीय संस्कृति में आचार रहने वाले विद्वानों ने वेद को स्वतंत्र, निर्वाचित और अपूर्व रूप में उनकी यह मान्यता है कि वेद का प्रामाण्य ईश्वरीय ज्ञान के रूप में
हुआ है, जिस प्रकार इंस्ट्रक्शन अनादि, अनन्त और अविनाश्चर है। इसलिए उपनिषदों में वेद को इंस्ट्राक्शन का निश्चय कहा गया है। वेदों के महान माननक श्री साभारायण ने अपने 'वेदभाष्य' में लिखा है –
“यथा नित्यवलतं वेदा यो वेदयातिनिवलतं जगत।
निम्नम् तमम् वर्त्तथायिथः महेशनेम्।”

अर्थात् वेद इंस्ट्रक्षन का निश्चय है, अतः परस्मेश्चर द्वारा निर्मित है। वेद से ही समस्त जगत का निर्माण हुआ है। इसलिए वेदों को अपौरुषीय कहा जाता है कि मूल ने वेद को समारोह भ्रम कहा है। लेकिन आचार्य में कहा गया है कि “सबसे पहले, अतः उससे निस्तुल हो वेद अपौरुषीय है।”

महार्षि व्यास वेद ने लिखा है – “वेदों नारायण साधकः” तथा “वेदों नारायण साधकः श्रवणूत्ति शुरुमृ” अर्थात् वेद साधक नारायण है, वेद स्वयं है। अतः वेद अपौरुषीय है।

“भाराशाही निम्नम्” के शरीर है – “अभिनवाधिन विश्व माननक स्वाभाविक है। वेद ने युक्ति के सदृशी के स्वाभाविक द्वारा जीवन निम्नाम् और विश्वात्मक अवश्य यथ्यायाम्” अर्थात् वेदों की अपौरुषीयता अवधारणा सहित यह कि उनसे मूल, विश्वात्मक, विश्व में धारणे वाले अवधारणा ही नहीं, विश्व व्यवस्था तथा अवधारणा भी ज्ञात होते हैं। ऐसी दिशातर्क और अवधारणा सहित कहीं भी बुद्धिमत्ता नहीं है, निम्नाम् ही वेद अपौरुषीय है।

सुप्रसिद्ध वेदभाष्यकार साधुवर्ण द्वारा का मत है कि “स्वप्रकाश सूर्य जोस प्रकाश दुर्गम लिखितों का भी बोध कर सकता है, उसी प्रकार वेद भी अविनाश्चर और अदुर्गम, व्यवस्थापनी शक्ति से युक्त है। स्थानातिदेश में स्वप्रकाश की शक्ति नहीं है, जबकि सूर्य एवं चन्द्रमा ऐसी शक्ति है। मूषादिदेश में स्ववस्थापितों की शक्ति नहीं है, जबकि पूजा, जो अविनाश्चर समारोह से युक्त है, इत्वस्मृति-प्रतिवन्धक की समान स्वप्रतिपादकता शक्ति से युक्त होते हैं।
Corresponding Author: email:

"ज्युहस्त मा प्रदीशाः कर्णधनिः।"16 छौङ ते आदेश शादाचार के संकेत प्रमुः का संवर्धन करने वाले हैं। "स्वर्गः पथा सुकृते देवानाः।" एवम् या ज्योति की ओर ले जाने वाला देवानाः पथ सुकृते सदाचारी के भाव की वस्तु है।

ज्योति प्राप्त करते हैं कि हे देव! हमें उदयहर्ष से पूर्वक करे और सब आए से शादाचारी का भागी बनाये। हम अमर दोष का अनुसरण करे तथा उत्तम आयु हास्य और शोभा जीवन लेकर उपर उठ जाएं। सदाचारी हो व्यक्ति का उपर उठाता है।

दुराचार तो नीचे गिरने वाला एवं हम आयु को क्षीण करने वाला तथा रोगों का केंद्र बनाने वाला होता है। सदाचार से निरोगता प्राप्त होती है।

स्वर्ग पंथी साधारण शादाचार का पथ है-- वेदों में कहा गया है कि स्वर्ग पथ ही साधारण का पथ है। आचार्य सायण ने स्वर्गत शब्द का अर्थ "अविनाशी मंगलम्" अथवा शारणत्व कल्याण बताया है। इस प्रकार स्वर्गत पथ साधारण और शारणत्व कल्याण का पथ है। "अध्येय (6/51/15) में कहा गया है-- "स्वर्ग पथानुसार रूपम्" अर्थात हम अविनाशी और कल्याणदेव मार्ग पर चलिए। "मा प्रेम पशों यथा मा यज्ञदेवदिन मोहिन। मात्र यथा अयोधेष्।"17 अर्थात हम स्वयं छोड़कर कभी न चलें। वैभवयुग होकर व्याप्ति का न त्यागम्। हमारे अन्तर श्रद्धालु न रहें। हमारे क्रिया कृत्तित में प्रवृत हों। "भूत नन् कृपुषा।"18 अर्थात हम प्रवृत हमारे नन्दाधारण कायम की ओर प्रवृत करें।

"युंयोहस्मणुरामणेन।" अर्थात कुटिलता के पाप पथ से हमें दूर रखें। "सुनः कर्मसुपहिक स्वस्थे।" अर्थात सुपात को प्रथु हमारे लिए सुरक्षाकर दें जिससे हम कल्याण के भाजन बन सकें।

रूपी कहते हैं कि यदि "न न पशुधात अर्थ नस्तात।" अर्थात पाप हमारे पीछे न पड़े तो "भद्र मन्त्र न पूर्व।" अर्थात भद्र मिश्रित रूप से हमारे सामने आ जायेगा। "विस्मृत: देव वाच्यविशिष्टादित्यं परसुपुषु।" अर्थात हम प्रभु हमारे दुराचारू दुराचारू दुराचारू हो जो भूत हैं, कल्याणकारी हैं, मंगलमय हैं, वे हमें प्राप्त हों। दुराचारू या कुर्सित आचार्य हमारे विनाश का कारण हैं, जबकि सदाचार हमें प्रतिपादित करते हैं। "स नः पुरुष श्रेयस्य भुवत।" अर्थात सदाचार हमें पोषण देता है तथा हमारी श्रेय सकता है।

स्वर्ग और ज्योति-- वेदों के अनुसार स्वर्ग सदाचार है। वेदों में है "स्वर्ग" और "सत्त" का गुण है। ज्योति का संबंध चर और संदर्भ से है। सत्त का संबंध अन्य और अश्वत से है।

इस आचार पर सत्ता द्वारा निमित्त जो जीवन की सत्तर्तम स्थिति से संबंध रखते हैं और ज्योति जे निमित्त जो उसकी गतिमान और क्रियामय स्थिति से संबंध रखते हैं। यहीं तो निमित्त विवेचन का चतुराय जड़ा आचार्य आचार्य और अश्वत स्थितियों का नियंत्रण करते हैं। वेदों में ज्योति या सदाचार
अर्थात यज्ञीय देवताओं के लिए भी जो पूजा है, मनुष्यों के लिए भी जो पूजा है, मनुष्यों के लिए भी जो पूजा है, ऐसे अंग कृतज्ञ देव आज प्राप्त होकर हमें पुद्र दे तथा हमारा पालन और करयाम करें।

इस प्रकार वैदिक अंधियों ने अंत को शान्ति और कल्याणकारी मानते हुए विभिन्न देव-देवताओं की स्वातंत्र्य की है। वर्तमान क्षेत्र का पूरा यज्ञशाला माना गया है, जिसके सम्मान देवालयों के लिए आधिर दिया जाता है। इसलिए अर्थात कहते हैं कि “हे जगदीश! आपकी कृपा से चन्द्रमा हम दोनों के लिए सुख करें, धन और अर्थ हमारे लिए सुख करें, मेघ, यज्ञ, आधित्य आदि सभी हमारे लिए सुख करें।”

मिन्ट और वर्ण अंत के संसर्ग—“अंत च च सत्य चामीडाँग्न तपस्विवाजयायत”। अर्थात सत्य्रथा प्रकारसाधन परमेश्वर के तप से अंत और सत्य उत्पन्न हुए। अंत के सत्यफल में 15 मंत्र हैं, जिनमें मेन्त्र वर्ण यमिश्वर द्वारा अंतिम से शुरू बुद्धि की कामान, वाणी में परिवर्तन, योगायाम, सुख शान्ति और दौर्थ्य आयु की पारंपरिक नई हैं। इसी तौर पर, अन्तर्त्थ्य और जल के सभी देवताओं से प्रारंपरिक नई है, फिर भी भिन्न और वर्ण को अंत का संसर्ग माना गया है। दोनों देवता ही सत्य की प्रारंपरिकता करते हैं। ये दोनों नैतिक और मौलिक नियमों के संसर्ग भी हैं। ये सुक्ता का सत्य स्वीकार करते हैं। इन्हें के कारण दिन और रात के नियम स्थिर हैं। ये दोनों देवगण ने कृतिक प्रारंपरिक व्यवस्था के रूप में इसके संसर्ग हैं, तब कृतिक नियम के रूप में इसके संसर्ग हैं। वे पुरातनाओं के नियम और दुर्ग आपहारों के स्त्रोत हैं। इसलिए मनुष्य को दुराराह देर स्वाभाविक समाज का मान्यता बदलने के साथ-साथ उनके संसर्ग आशीर्वाद करने बदलते हैं।

अंत कर्मकाल का व्यवस्थापन है— वैदिक नैतिकता यह मानता है कि अंत कर्मकाल का व्यवस्थापन है। वैदिक प्रारंपरिक और नैतिक नियम ही कर्मकाल सिद्धांत के रूप में स्वीकृत है। आज कर्म का अच्छा परिणाम और पुरुष कर्म का अच्छा परिणाम मिलता है। मनुष्य को सदैव समर्पित करने बदलते हैं। अर्थात प्रारंपरिक कर्म के संसर्ग में मुख्यत व्यक्त—23 अर्थात हमारी शक्तिशाली मौलिक व्यक्ति कभी भी दुष्कर्म स्वाभाविक बना नहीं रहता। “मा नै द्वितित्व कर्तव्” 29 अर्थात हमारे
कोई सन्नता करने वाला न हो। वेदों का प्रतिपाद्य विषय यह है कि वे मानव मात्र का मार्गदर्शन करते हैं कि मनुष्य को जन्म से लेकर मुनुपुर्वक तक प्रवेश, क्षय करना चाहिए और क्या नहीं करना चाहिए? साथ ही प्रात-जागरण से लेकर रात्रि शाम तक समूपं चर्म और किरा-कलाप का होना चाहिए। अथवेद में कहा गया है कि पूर्वपुर्व के अव्वे-फूरे कर्म के अनुसार ही जीवनात्मा नवीन योगियों में सफल धारण करता है। अथवेद के अनुसार—
“आ यो धर्मां धमन: ससास ततो वृषभ कृष्णे पुरुषोऽधार्यो निः प्रयोज्ये आ यो प्रयोगिः”।27

अर्थात् “कृत्यप्रकाश” और “अकृत्यप्रकाश” नहीं होता है। अर्थात् का सिद्धांत कर्मफल का जन्मदत्त है। प्रत्येक व्यक्ति कर्म करने के लिए स्वतंत्र है, किन्तु उसे कर्मनुसार फल तो भोगना ही पड़ता है।

निष्कर्ष — उपर्युक्त सन्निहित विवरण से यह स्पष्ट है कि “अर्थ” की अवधारणा वेदों की मौलिक और महत्वपूर्ण अवधारणा है। वेदों में जिसे अर्थ कहा गया है, कालान्तर में उसे “कर्मचार” का नाम दिया गया। कर्मचार इसी अर्थ का विकरित, परिमाणित एवं संशोधित रूप है। वेदों में कहा गया है—”अर्थ स च सत्यवाचमि ततसौज्याजातत्” अर्थात् तपस्या से पहले अर्थ और उसके बाद सत्य की उत्पत्ति हुई है। हम यह कह सकते हैं कि अर्थ प्रकृति विधान का तथा नैतिक विधान का नियम है।

नैतिक विधान के लिए ही अर्थात्तियों ने देवताओं से अनेक प्रार्थनाओं की थी। अर्थ वस्तुतः सदाचार का मार्ग है और स्वस्त धारा ही सदाचार का पथ है। अर्थ मनुष्य के लिए कल्याणकारी मार्ग है। अर्थ कर्मफलदत्त है। निःत्र व वरुण अर्थ के संसर्ग से देवता है।

संस्कृत में अर्थ की अवधारणा वेदों की महत्वपूर्ण अवधारणा है, जो प्राकृतिक समस्यात्, नैतिक विधान, सवारण, सुखों के हेतु एवं कल्याणकारक है। कर्ममंडल के आदर्श पर अर्थ एवं कर्म के लिए पुरुषार्थ तथा कुलनिश दुरुपार्थ से हिस्से का व्यवस्थापक करने के लिए पुरुषार्थ धर्म है। कर्ममंडल—प्रार्थना के लिए पुरुषार्थ, आम्योनित्ति के लिए संसर्ग—निरुपण, समुहित जीवनमंडल के लिए सदाचार व कल्याणकारी मार्ग तथा पवित्रता आदि ही के लिए सुमांगल नियम अर्थ पर आपातित है।

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Seasonal Variations In Physico-chemical Parameters Of Dholawad Dam Special Reference To Khedi Kalan Station Of Ratlam District (M.P.)

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ABSTRACT
The Dholawad dam is situated near village Vasindra, Ratlam (M.P.) India. This medium sized dam is mainly constructed for irrigation purpose but water is also reserved for drinking. It is about 18 km. away from Ratlam city and is surrounded by hills and small villages like khedi khurd, khedi kalan, Dhabaipada and Naya tapra. In the present study the physicochemical parameters of Khedi Kalan station of Dholawad dam water analysed for a period of one year (March 2014 to February 2015). The present study deals with the changes in physico-chemical parameters such as Water Temperature, pH, Transparency, TDS, DO, Total alkalinity, Total hardness, BOD and Chloride. The present study will be beneficial not only academically but also to improve the socioeconomic importance of the water body.

Keywords: Physico-chemical, Dholawad dam, Water, Dissolved oxygen

INTRODUCTION
Water is the most essential element of life. It is the major constituent of the fluids of living organisms. Water is a precious gift of nature on earth. It covers 71% of earth surface. The area of aquatic habitat is more than any other habitat. To understands the aquatic habitat, it is necessary to get the informations of hydrobiology of aquatic resources. Hydrobiological study reveals the relationship of physicochemical characteristics of water with its aquatic flora and fauna available in it. Hydrobiological regime changes from one surface water resource to another. Namdeo et al (2013). Quality of an aquatic ecosystem is dependent on the physico-chemical parameters of water. The healthy aquatic ecosystem is depended on the physico-chemical and biological characteristics. Venkatesharaju et al (2010).

Material and methods:

a. Study area:
Ratlam known historically as Ratnapuri is a city in the northwestern part of the Malwa region in Madhya Pradesh state of central India. Ratlam is situated in North-West region of Madhya Pradesh from 23 05' North to 23 52' North Longitude and 74 31' East to 75 41' East Latitude. Total Area of Ratlam District is 4861 Sq.km. which is 1.11% of Total Area of Madhya Pradesh. Ratlam has humid subtropical climate. The average rain fall is 37 inches (937mm). Ratlam gets moderate rainfall of 35 to 38 inches (890 to 970mm) from July through September, due to the southwest monsoon. Present investigation is an attempt to develop understanding about the hydrobiological regime of Dholawad dam. This dam is situated in a rural area of Ratlam district and used for drinking water supply, fisheries, irrigation, Cattle bathing and human activities are seen there. This is a medium irrigation dam. It is located in 23° 16’ N latitude and 74°54’ E longitude. The Dam constructed at river Jaman a tributary of Mahi River near village Vasindra of Ratlam district. The present study is first
b. Sampling and analysis of water:
To study the physicochemical changes and profit structure of Dholawad dam seasonal observations taken for one year (Summer, Rainy and winter) from March 2014 to February 2015. The surface water sample were collected with one liter containers from the dam in between 7 A.M. to 11 A.M. Temperature, Transparency, pH, DO were analysed at the site. The water samples were collected from Dholawad dam from selected station khedi kalan (Intakewell side) for a period of 12 months. Temperature is an important physical parameter. The water temperature was recorded by using thermometer and digital portable kit. Secchi disc was used to measure the transparency of water. The pH was determined by using Hanna pH meter, pH paper and digital portable kit. The chemical parameters of water such as Dissolved oxygen, total alkalinity, total hardness, chloride, total dissolved solids, and BOD etc. were determined by Standard methods APHA (2012), Trivedi and Goel (1986).

Result and Discussion -
Physico-chemical parameters Khedi kalan station of Dholawad Dam during the period of March 2014 to February 2015 are represented seasonally in the table 1 and seasonal variations in water quality are depicted in figure 1.

Water temperature is determining factor for seasonal distribution of living organisms, solubility of gases and salinity (salts content) in water. In the present study the water temperature ranges from 20 to 31.3°C recorded at the station. The season wise analysis showed that the highest values recorded in summer, moderate in rainy season & lowest in winter season. Pawale and Lokhande (2012) reported the water temperature varies from 21.5 to 31.0°C in Dhanora reservoir. Similar finding were observed in the present study.

The light penetration of transparency of a water body is an important factor on which the productivity of a water body depends. In present investigation the transparency is maximum in winter months 102.32 cm and minimum during month of August 29.19 cm. Low transparency values may be due to high turbidity levels in August and the high transparency in December due to the subsequent settlement from December. Similar observation reported by M. J. Lubal et al (2012) in Mhaswad water reservoir of Satara distt. Maharashtra.

The Total dissolved solids ranges from 280.22 mg/l to 220.46 mg/l the maximum value was recorded in month of August and minimum during month of May. Similar observation reported by Kumari et al (2013) in two reservoirs of Narmada River MP, India.

pH plays an important role for the growth of flora & fauna in the Dam. The most of the aquatic organisms are adapted to a average pH & do not withstand abrupt changes. Dholawad Dam ranges from 7.1 to 8.3 maximum 8.3 in the month of March and minimum 7.1 in the month of July. Similar result reported by P. K. Patel (2016) in their study on Fish pond, Shahdol (India). The high pH value was recorded during summer season because aquatic plants use carbon dioxide in
their photosynthetic activities and its removal is responsible for high pH value and minimum pH value was recorded during rainy season.

Dissolved oxygen is very important parameter of water quality and is an index of physical & biochemical processes occurs in water. The dissolved oxygen values are ranges from 6.2 to 9.9 mg/l. Maximum average value 9.9 mg/l of oxygen during the month of December and minimum 6.2 in the month of March. The similar observation of dissolved oxygen reported by R. jain (2008) in singwasa reservoir Guna. In the present investigation the high values of dissolved oxygen during winter seasons was due to low temperature and high photosynthetic activities and low values of dissolve oxygen during summer is due to high temperature and high rate of oxidation of organic matter.

Total hardness ranges from 120.29 to 143.38 mg/L. The minimum values of hardness were observed in the month of January and maximum in the month of May. The similar results were observed by Simpi et al (2011) Hosahalli tank in Simoga district, Karnataka. Meshram et al (2015) recorded in the range of 107.7 mg/lit to 260.5 mg/lit mg/lit. Maximum total hardness registered was 260.5 mg/lit in the month of May and minimum 107.7 mg/lit in month of November in Balsamudra Lake, of Pauni Dist. Bhandara, Maharashtra.

The total alkalinity ranged between 112.42 mg/l to 130.31mg/l. The maximum value 130.31 mg/l in the month of May and minimum value 112.42 mg/l in the month of January. Similar result reported by M.S. Hujare (2008) his study on perennial tank of Talsande, Maharashtra.

BOD is the volume of oxygen required by bacteria to metabolize the organic compounds under aerobic conditions,( Neeri, 1986). In present investigation lowest BOD value is seen in summer season which is 0.7 mg/l and highest value 1.9 mg/l is recorded in winter. The maximum BOD was noticed during December due to decrease in temperature which leads to increase in microbial activities. Similar results in both seasons observed by Ramulu and Benarjee (2013) in their study on Nagaram Tank of Warangal, Andhra Pradesh.

Chloride is very important inorganic anion in water. Sudden increase in chloride concentration in fresh water is considered to be the indication of pollution. Due to higher Chlorides in the water was recorded in the month of April 26.25 mg/l and minimum value 16.22 mg/l in the month of December. Similar result Noticed by Bade et al (2009). Who worked on physicochemical parameters in Sai Reservoir in Latur Maharashtra. Higher concentrations of chloride give a salty taste to water and beverages. The desirable limit of chloride of drinking water is 250 Mg/l as per Bureau of Indian standard.

Table 1

<table>
<thead>
<tr>
<th>season</th>
<th>Month</th>
<th>Water Temp °c</th>
<th>TDS Mg/l</th>
<th>Transparency Cm</th>
<th>pH</th>
<th>Total alkalinity Mg/l</th>
<th>Total hardness Mg/l</th>
<th>DO Mg/l</th>
<th>Chloride Mg/l</th>
<th>BOD Mg/l</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summer</td>
<td>Mar14</td>
<td>31.3</td>
<td>225.16</td>
<td>76.00</td>
<td>8.3</td>
<td>120.43</td>
<td>128.27</td>
<td>6.2</td>
<td>25.00</td>
<td>1.1</td>
</tr>
<tr>
<td></td>
<td>Apr</td>
<td>31.0</td>
<td>223.30</td>
<td>72.81</td>
<td>8.2</td>
<td>122.17</td>
<td>135.00</td>
<td>6.3</td>
<td>26.25</td>
<td>0.8</td>
</tr>
<tr>
<td></td>
<td>May</td>
<td>29.3</td>
<td>220.46</td>
<td>69.61</td>
<td>8.0</td>
<td>130.31</td>
<td>143.38</td>
<td>6.3</td>
<td>25.37</td>
<td>0.7</td>
</tr>
<tr>
<td></td>
<td>Jun</td>
<td>26.2</td>
<td>240.14</td>
<td>63.00</td>
<td>7.8</td>
<td>125.29</td>
<td>138.52</td>
<td>6.4</td>
<td>25.16</td>
<td>0.9</td>
</tr>
<tr>
<td>Monsoon</td>
<td>July</td>
<td>24.0</td>
<td>273.46</td>
<td>31.44</td>
<td>7.1</td>
<td>128.52</td>
<td>134.27</td>
<td>6.5</td>
<td>24.74</td>
<td>1.3</td>
</tr>
<tr>
<td></td>
<td>Aug</td>
<td>24.0</td>
<td>280.22</td>
<td>29.19</td>
<td>7.2</td>
<td>129.20</td>
<td>134.44</td>
<td>7.0</td>
<td>23.91</td>
<td>1.2</td>
</tr>
</tbody>
</table>
Table 1: Physico-chemical seasonal analysis of Dholawad dam of Ratlam, during the month of March 2014 to February 2015

<table>
<thead>
<tr>
<th>Month</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Jan15</th>
<th>Feb</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>21.2</td>
<td>21.6</td>
<td>20.9</td>
<td>20.0</td>
<td>21.4</td>
<td>26.6</td>
</tr>
<tr>
<td>TDS</td>
<td>276.30</td>
<td>264.36</td>
<td>258.21</td>
<td>240.42</td>
<td>238.36</td>
<td>227.20</td>
</tr>
<tr>
<td>Transparency</td>
<td>38.43</td>
<td>58.31</td>
<td>84.24</td>
<td>102.32</td>
<td>99.22</td>
<td>98.16</td>
</tr>
<tr>
<td>pH</td>
<td>7.2</td>
<td>7.3</td>
<td>7.5</td>
<td>7.5</td>
<td>7.7</td>
<td>7.9</td>
</tr>
<tr>
<td>Total Alkalinity</td>
<td>117.00</td>
<td>117.34</td>
<td>119.68</td>
<td>116.00</td>
<td>112.42</td>
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<tr>
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<td>125.25</td>
<td>133.23</td>
<td>126.11</td>
<td>120.29</td>
<td>123.18</td>
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<tr>
<td>DO</td>
<td>6.9</td>
<td>7.1</td>
<td>8.8</td>
<td>9.9</td>
<td>9.2</td>
<td>7.1</td>
</tr>
<tr>
<td>Chloride</td>
<td>23.18</td>
<td>19.00</td>
<td>18.14</td>
<td>16.22</td>
<td>18.39</td>
<td>20.27</td>
</tr>
<tr>
<td>BOD</td>
<td>1.4</td>
<td>1.7</td>
<td>1.8</td>
<td>1.9</td>
<td>1.8</td>
<td>1.6</td>
</tr>
</tbody>
</table>

Fig 1: Physico-chemical seasonal analysis of Dholawad dam of Ratlam, during the month of March 2014 to February 2015

Conclusion

Water is a unique component of nature and play an important role in the life from molecules to man. The quality of water is described by its physical, chemical and biological characteristics. Therefore it is very essential that quality of drinking water must be monitored regularly at different time interval because the physicochemical characteristics of the aquatic environment directly influence the life inhabiting it. Present study provides a base line data for the monitoring of the pond. A few efforts like presentation of leaching of nutrients from catchment area through plantations would definitely yield good results. From the present data it is concluded that almost all the parameters are within the prescribed limit of WHO and BIS Standards. The Dholawad dam water is suitable for drinking purposes it is also useful for irrigation and fish culture activities because the physico-chemical parameters are within the range. Aquatic habitats may be in danger in year to come due to excessive exploitation of water for irrigation and other purposes.

Acknowledgement

The author is grateful to the P.H.E. department of Ratlam (M.P.) and Dept. of zoology of Govt. Arts and
Science college Ratlam and Govt. Madhav Science college Ujjain for providing necessary laboratory and library facilities.

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Article

Research Analysis of Tayammum In the light of Qur’an and Ahadith

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Literal Meaning of Tayammum is an ‘aim’, or ‘purpose’ In Islamic Law, it refers to: 'Aiming for seeking soil to wipe one's face and hands with the intention of purification and preparing oneself to pray, and so on.'

In 5th Hijri, the revelation of Qur’an Verse for Tayammum was on occasion when the Prophet Muhammad S.A.W and Sahaba Ikram R.A (Companions of Prophet S.A.W) were returning from Ghazwa Bani Mastalaq. Ummul Momineen Hazrat Ayesha R.A was also accompanied with Rasool Allah S.A.W. When the Caravan was about to Reach Medina Munawwara, Hazrat Ayesha Siddiqa R.A come to know that her necklace has fallen down. The Caravan stopped everyone was searching Ummul Momineen’s (R.A) Necklace. When the prayer time came Sahaba (Companions) of Rasool Allah S.A.W were tensed as they did not had enough water for ablution. Rasool Allah S.A.W Came to know the situation and So Allah revealed the Divine Verses of Tayammum. The Muslims were pleased to have this favor [1].

Islamic Point of View for Tayammum

Tayammum is a proven practice by Qur’an, Sunnah and Ijma

O Believers! Approach not prayer while you are intoxicated, until you have much sense that what you say, you understand, nor when you are unclean, without taking a Bath except when you are travelling and if you are ailing, or on a journey, or any one of you comes from privy or you have touched women and you do not find water, then take some pure earth and wipe therewith your faces and your hands. Undoubtedly, ALLAH is pardoning and forgiving. [2]

When One do not have availability of water, means if water may be too far or if Water may be harmful in condition of illness or if finding water could be dangerous due to any enemy i.e. any harmful animal or Human. This is allowed for those who are sick, or travelers in journey, or those who don’t have water available, and are in need of purification, in intention to get purify and perform prayers can purify through Tayammum.

[3]

Above mentioned Verse [2] describes those conditions in which Tayammum is allowed. First is illness. If a person is suffering from some illness and there is fear of getting worse if he/she may do Ghusl or Ablution, in such condition he / she may purify through Tayammum. Second is Travelling. If a person is travelling and he need to do Ghusl, but water is not available or difficult to
Corresponding Author: email: 

get, then he/she may do Tayammum. Tayammum can be done in replacement of both Ghusl and Wudu (Ablution) applied with the required conditions. Third Condition in nature call (defecate or urinate). And fourth is if a person had gone through sexual intercourse or wet dreams and he do not have availability of water can do Tayammum.

Now here it is necessary to explain the medium of Tayammum and what are the conditions for it which are mentioned in the above mentioned verse [2]. Tayammum can be done by purified soil. It is the first layer or surface of the land. According to Allamma Imam Ahmed Raza Fazil Barelvi A.R, Soil or any form of it which could be stone, sand, gypsum etc. can be used for Tayammum. [4]

The procedure of Tayammum is different according to Fuqaha. Some explains the procedure as First, one must have the intention to perform ablution and purifying himself, then he mentions Allah's name, strikes the soil with his hands, and wipes his face and then second time strike again and wipes his hands up to the elbow, starting with the right hand. Imam Abu Hanifa (A.R), Imam Shafai (A.R), Imam Malik (A.R) and most of the Fuqaha follow this procedure of Tayammum, and Sahaba (companion of Prophet S.A.W) and Tabaeen (Those Muslims who met Sahaba). While some accept the procedure that one must Allah's name, strikes the soil with his hands, and wipes his face and hands up to the wrist. Imam Ahmed bin Humble (A.R) also follow and preach this procedure of Tayammum and usually people following Ahl-e-Hadiths do follow the same procedure.

It is not necessary to strike the hand on earth surface. For Tayammum any dusty dry element can be used which is clean, pure and formation of soil like sand etc. Some people think that how can one have purification by striking on soil in such manner. However literally this procedure is for making one feel purified. And it will make one feel purified even he/ she is not able to have water for long time. And he/she will be following the principle of purification in Sharia. Further he will not forget the difference between allowed conditions for praying and those which are restricted. [5].

Whoever moves toward becoming Junub whether as the consequence of a wet dream, or intercourse with a women needs to do ghusl and supplicate. On the off chance that he can't do ghusl on the grounds that there is no water or in light of the fact that he will be hurt by utilizing it –, for example, on the off chance that he is debilitated and utilizing water will aggravate his problem, or there is a cold breeze and he fears that on the off chance that he does ghusl he will end up noticeably wiped out with a migraine or frosty or bronchitis – then he ought to do tayammum and ask. This applies similarly to men and ladies. He (or she) doesn't have the privilege to postpone the petition past its recommended time. [6].

Returning from a Journey, Ummul Momineen Hazrat Ayesha R.A was likewise went with Rasool Allah S.A.W. At the point when the Caravan was going to Reach Medina Munawwara, Hazrat Ayesha Siddiqa R.A came to realize that her jewelry has tumbled down. The Caravan halted each one was looking Ummul Momineen's (R.A) Necklace. At the point when the petition time came Sahaba (Companions) of Rasool Allah S.A.W were strained as they didn't had enough water for ablution. Rasool Allah S.A.W Came to know the circumstance thus Allah uncovered the Divine Verses of Tayammum. The Muslims were grateful to ALLAH and Praised Hazrat Ayesha Siddiqa (R.A). Tayammum has binding that one should have intention to be purified first of all then start with saying Bismillah and strike the inner side of the hand (palm) with stretched fingers, on the pure soil and first wipe the face, and again repeat.
the strike of hands on soil and wipe the hands up to elbow. [7]
if you are ill or you are on a journey, or any of you comes from privy or you have intercourse with women and in these conditions you do not get water then strike your hands on pure soil and wipe therewith your faces and again strike and wipe your hands up to elbows. This (Tayammum) will become replacement of wudu. ALLAH blesses upon you and teach you those which is easy for you and He is the most merciful and may forgive your sins. [8]
This Verse asset of the issues and benefits, which has been discussed in detail by Hanafis (those who follow Imam Abu Hanifa A.R) and Shafai (Those who follow Imam Shafai A.R), in their summaries.
Some of the points are listed below:

1) Unlike other books of ALLAH, Holy Qur’an was not revealed in one time as whole. But it was revealed as per different occasions happened with Sahaba-e-Rasool (S.A W), and hence ALLAH made Sahaba, a blessing for Muslims. For Hazrat Ali (R.A) Alcohol was prohibited, Due to Hazrat Umar (R.A) sexual intercourse was allowed in Ramadan Nights, and because of the incident of lost necklace of Hazrat Ayesha (R.A), Ummah was blessed with Tayammum. So those who do not are oblige the Sahabas are selfish.

2) In case of such condition after intercourse, or after menses, Prayers are not allowed without purification. And if water is not available then Tayammum is a blessing.

3) If one do not have water means if water may be too far or if Water may be harmful in condition of illness or if finding water could be dangerous due to any enemy i.e. any harmful animal or Human. In all of these condition Tayammum is allowed. A reference to this could be seen in the Prayers of Imam Hussain (R.A) when near river Farad he performed with purification of Tayammum.

4) Pure form of soil is allowed for Tayammum, pure soil are those which are made of soils, and are not burned in fire and or are not transformed into ashes, such as sand , stone , mineral coal, mineral salt etc.

5) Impure soil cannot be used for Tayammum, as for those things which are not pure how can one use it for purification. And intention is the first condition as discussed earlier as Tayammum meaning shows that it is an aim / intention for purification

6) In Tayammum we need to wipe the hands up to elbow, as we wash our hand in ablution (Wudu).

7) In these verses, touching women means having intercourse with women.as explained earlier, that only in case of intercourse the ghusl is required and hence Tayammum will also be done in such condition and touching women doesn’t require ablution or ghusl.

8) In journey intercourse with wife is allowed as water availability is not a condition for having intercourse and one can do Tayammum as replacement.
Tayammum is revealed as blessing of ALLAH to the Ummah. As mentioned in Qur’an and Ahadith, below are Ahadith and Qur’an verse which explained the blessing of ALLAH by revealing Tayammum

As per Qur’an:

O Believers! When you wish to stand for prayers, then wash your faces and your hands up to the elbows and pass your wet hands over your heads and wash your feet up to your ankles. And if you are in need of bath, then purify yourself well. And if you are ill or you are on a journey, or any of you comes from privy or you have intercourse with women and in these conditions you do not get water then betake your selves to clean earth and wipe therewith your faces and your hands. Allah desire not that He should place you in any difficulty, Yes, He desires to purify you well and to complete His favors upon you so that you may be grateful. [9].

Several Ahadiths also mentions this blessing such as:

Narrated by Hazrat Imran (R.A), “We were on a journey with Rasool Allah (S.A.W), and Prophet (S.A.W) lead us to offer prayer (Jamat) after the prayer we saw a man was sitting alone on a side. The Prophet (S.A.W) asked him that why did he not prayed with the people (jamat) and he said he need to have ghusl and water was not available. Rasool Allah (S.A.W) then replied, “Take the Sand which is enough for you” [10].

Another Hadith Narrated by Hazrat Abu Zar (R.A) that Rasool Allah (S.A.W) said” Clean earth is the wudu’ of the Muslim if he cannot find water for ten years.” Then he said: “When you find water, then make it touch your skin.” [11]

These verses and Ahadith and Ijmas discussed in this article clearly described that Tayammum is a fully replacement of Wudu in case of discussed conditions.

And any prayer or ritual for which wudu is required can be performed with Tayammum.

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Role of NGOs in Promoting Eco-Tourism: A Case Study of Kashmir

Aijaz Ahmad Bund

ABSTRACT

NGO play’s an indispensable role in tourism management. Their task is to assist the government, private sector and communities in implementing, monitoring and evaluating responsible tourism. They attract funding from donor agencies to develop specific community-based tourism projects and also assist the government in conducting tourism and environmental awareness programmes among communities and the tourist industry at large. Tourism is important for many developing countries, as it is a source of foreign investment, foreign currency, entrepreneurial initiation, service-based job creation and local social enhancement. Many local and international NGOs are taking part in this development. An important part of sustainable tourism is ecotourism. Ecotourism is about uniting conservation, communities, and sustainable travel. It is seen by many as a way to bring economic development hand-in-hand with nature conservation. NGOs have emerged in the last decade as one of the principal advocates and implementers of eco-tourism practices. Therefore, many NGOs concerning international development seek to engage in ecotourism initiative. This paper will throw light on the role of NGOs and how they promote ecotourism in Kashmir.

Keywords: Eco-Tourism, Non-Governmental Organizations (NGOs), Case Study, Kashmir

INTRODUCTION

Mass tourism has been widely used as a development tool for boosting national, regional, and local economies worldwide. Recently numerous negative impacts associated with mass tourism have been recognized. Sustainability of the local culture, social structure, economic well-being and way of life are common goals that are inherently interconnected with the health of the natural resource base. The tourism industry, through ecotourism, is natural resource based but is also one of the competing use or demand of these resources. In recent years, there has been a rapid growth in the number of international tourists worldwide, from 528 million in 1995, to 1.085 billion in 2013, and that number is expected to rise to 1.6 billion in 2020. Tourism is important for many developing countries, as it is a source of foreign investment, foreign currency, entrepreneurial initiatives, service-based job creation, and local social enhancement (UNWTO, 2015).

In September 2015, the UN member states adopted the 2030 Agenda for Sustainable Development. In January 2016, the Sustainable Development Goals were set to come into effect, replacing the Millennium Development Goals from 2000. The importance of sustainable tourism is stated using three indicators, under three different goals. An important part of sustainable tourism is ecotourism, globally one of the fastest-growing tourism markets. It is seen by many as a way to bring economic development hand-in-hand with nature conservation. Therefore, many non-governmental and not-for-profit organizations (referred to in this piece as NGOs) concerning international development seek to engage in ecotourism initiatives.
Tourism is included as targets promoting sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all; Sustainable Consumption and Production and conserving and sustainably using the oceans, seas and marine resources for sustainable development. Ecotourism is defined as “responsible travel to natural areas that conserves the environment, sustains the well-being of the local people, and involves interpretation and education”. It represents a set of principles that have so far been successfully implemented in various global communities, and are supported by extensive industry and academic research. When properly executed, ecotourism exemplifies the benefits of socially and environmentally sound tourism development.

“Ecotourism is about uniting conservation, communities, and sustainable travel. This means that those who implement, participate in, and market ecotourism activities should adopt the following ecotourism principles: (1) Minimize physical, social, behavioral, and psychological impacts; (2) Build environmental and cultural awareness and respect; (3) Provide positive experiences for both visitors and hosts; (4) Provide direct financial benefits for conservation; (5) Generate financial benefits for both local people and private industry; (6) Deliver memorable interpretative experiences to visitors that help raise sensitivity to host countries’ political, environmental, and social climates; (7) Design, construct and operate low-impact facilities; (8) Recognize the rights and spiritual beliefs of the Indigenous People in your community and work in partnership with them to create empowerment” (TIES, 2015).

In nutshell, the term ecotourism refers to tourism-related activities in and around its protected areas, and focuses on management tools, systems, and processes that guarantee these three elements: (1) biodiversity and ecosystem conservation; (2) education and learning to enable hosts and visitors to understand and engage with management approaches to protect and conserve the natural and cultural assets of these areas; and, (3) economic and social benefits to communities in and around protected areas that (a) reduce their demand for the natural assets of these areas, and (b) engage them in collaborative approaches to protected area management.

**NGOs and Ecotourism**

NGOs have emerged in the last decade as one of the principal advocates and implementers of ecotourism practices. For tourism and conservation, NGOs are the organizations that have diverse memberships composed of community adherents, the tourism industry, conservationists, social activists, and so on. Thus NGOs also act as specialized groups of stakeholders, for example environmentalists or consumer advocates. NGOs also have non-membership associations, such as the Pacific Asia Tourism Association (PATA). Many NGOs are moving forward with the general concept of sustainability, but are also developing projects of their own, experimenting with different approaches to achieve their sustainability and conservation goals.

Conservation is the primary mandate of several international as well as national and local NGOs such as the World Wide Fund for Nature (WWF) and the Wildlife Conservation Society (WCS). Many of these organizations have embraced ecotourism as a form of development that is complementary to the goals of their conservation efforts. This is mainly due to ecotourism’s relatively modest negative impact on natural and cultural environments, compared with many other economic activities. It is also partly due to ecotourism’s ability to provide opportunities for economic benefits to communities residing in the landscapes which these NGOs seek to conserve. International NGOs such as the Nature Conservancy and Conservation International demonstrate their belief in ecotourism as a development and conservation tool through the operation of ecotourism departments within their institutional frameworks (Weaver, 2001).

NGOs have mainly focused on four essential components of ecotourism. They are:- (1) ecotourism-related financing mechanisms for conservation; (2) the establishment of tourism industry and resource management standards and especially voluntary guidelines; (3) research on the challenges facing the...
management of natural resources and ecotourism’s ability to address these issues; and (4) the education of stakeholders regarding solutions for coastal resource usage problems, including the implementation of genuine ecotourism. NGOs play a leading role in making visitor fees a successful option for funding national parks. The external NGOs help by building a coalition of support for fee establishment or a fee increase, while local NGOs serve as a voice for particular interest groups, for example managers of a particular coastal destinations or coastal user groups. The NGOs work in tandem with government agencies, and sometimes the tourism industry, to establish an equitable and feasible fee system for parks. Regulations, codes of conducts for tourists, and codes of practice for the industry are all part of larger efforts to set standards for conducting marine tourism and ecotourism in a given setting. NGOs also help with researching the issues related to the feasibility of ecotourism practices along with nature conservation and sustainable development. The research is only useful if it is distributed to policy-makers, scientists, managers, and the general public. Many NGOs are involved in a wide range of educational activities in general, and in ecotourism education-related issues in particular (Garrod & Wilson, 2003).

Though the preservation of biological diversity is urgent, insufficient, and underfunded. Practical management involves social as well as natural sciences, thus including multiple stakeholders - private, community and non-government organizations (NGOs) as well as government and multilateral agencies. Amongst these stakeholders, NGOs are believed to have an increasingly important role, through: formal and informal political lobbying; buying or covenancing land for conservation; and forming partnerships to undertake specific conservation projects. Thus establishing conservation-oriented ecotourism enterprises is one such approach. These enterprises aim to switch land and resource use from consumption to conservation, and to resist external threats such as large-scale land use change associated with primary industries. The relationship between these stakeholders is often complex, and the partnership arrangements influence the governance, management and the outcomes of projects. NGOs use different approaches and strategies, with different outcomes, in developed and developing countries respectively. Some analysts have argued that NGOs have successfully used ecotourism as a local conservation tool, either by operating tours, influencing the management of protected areas, or raising local awareness. Overall, it appears that NGO actions and strategies are determined partly by historical, environmental and legislative contexts in the countries, cultures and communities concerned; and partly by the internal history and structure of each NGO as an organization. Many authors as per the previous studies have suggested that NGOs in developed countries preferentially operate ecotourism enterprises themselves, or form partnerships with the government agencies in tourism policy and management for protected areas.

NGOs do certainly play a noteworthy role worldwide in the use of ecotourism for conservation, particularly through community-based approaches associated with protected areas in developing countries. Projects proposed by the NGOs adopt different management structures and different NGO roles, from projects proposed or established by local communities, private tour operators, or government agencies. In developing countries, rather than relying on national governments, NGOs endeavor to undertake conservation activities directly, including community engagement and revenue generation through ecotourism. Historically and at global scale, collaboration between the private tourism sector and the NGOs has not increased the proportion of successful ecotourism projects. It also indicates that the proportion of successful projects is greater for the NGOs working individually than for those collaborating with other NGOs (Brito, Buckley and Byrne, 2016).

**OBJECTIVES OF THE STUDY**

1. To throw light on the role of NGOs and how they promote ecotourism in Kashmir.
2. To recommend certain suggestions in order to promote ecotourism in Kashmir.
METHODOLOGY

The present study relies entirely on the secondary sources of data which is gathered from different books, journals, research papers, government reports, official records, newspapers and other unpublished material. The study area for the present study is chosen to be the Kashmir valley.

DISCUSSION & RESULTS

Eco-tourism in Kashmir

As per Hindustan Times report, “Eco-tourism gives tourists myriad experiences of the countryside and also helps locals living in remote areas. Under the eco-tourism project, the state promotes adventure tourism, trekking, water rafting, bird watching, fishing, night camps, forest camps, wetland visits and wildlife education. The virgin and untouched areas of the state make it perfect for eco-tourism. The potential eco-tourism activities attract different type of visitors and tourists in Kashmir for travelling in dense woods, trekking, long excursions, jungle tours, camping, wildlife education and viewing, bird watching and wetland visits. Viewing of rivers borders, springs, lakes, water wildlife species, water rafting, canoeing, fishing and boating besides dances, cultural folk and folk music are the part of eco-tourism in Kashmir also.” (Hindustan Times, 2009). Few years back the Department of Environment had pushed a proposal to the government for constituting Eco-Tourism Board with an aim to recommend measures and identifying potential sites for promotion of Eco-Tourism in Jammu & Kashmir because we all know that Jammu & Kashmir has great potential for Eco-Tourism and developing this sector has to be given utmost importance by the Government in view of the greater demand from foreign as well as domestic tourists (Daily Excelsior, 2015).

Around the world eco-tourism is flourishing so far. Thus for Kashmir, eco-tourism is also becoming an important economic activity. It provides opportunities for visitors to experience nature, and to learn about the importance of biodiversity conservation and local cultures. At the same time, eco-tourism generates income for conservation programs and economic benefits for communities living in rural as well as remote areas. But not all tourism to natural areas is eco-tourism. We are witnessing a rush to natural areas that, in many cases, is undermining the values that make these areas attractive. Because of their ecological value, nature areas, especially those within a wildlife protected area system, contain many of the greatest eco-tourism attractions. These attractions may consist of rare or endemic species of flora or fauna, high indices of species diversity, unusual or spectacular geomorphologic formations, or unique historic or contemporary cultural manifestations in a natural context. Protected area managers, then, are faced with the challenge of controlling and limiting the impacts of unfettered nature tourism while at the same time deciding where and how to plan adequately for the development of eco-tourism as a compatible economic development option. In such a case, the eco-tourism planning process is critical to achieving eco-tourism’s potential as a powerful conservation strategy. The distinct but intimately interrelated aspects of eco-tourism, conservation management, and business development, must be fully understood by ecotourism planners and protected area managers before moving ahead with plans to implement ecotourism activities (Greater Kashmir, 2013).

CONCLUSION

Conservation and development groups play a significant role in defining and directing the improvement of eco-tourism. They also serve as essential sources of financial and technical assistance for eco-tourism projects on the ground. Moreover, they facilitate negotiations between local communities and tourism developers, ensuring that the adequate links and mutual benefits are obtained. In addition, these groups often have members or constituencies that seek information and guidance on eco-tourism issues. Their support for particular eco-tourism projects contribute significantly to their success. The essential mandate of an eco-tourism organization is to minimize the negative impacts of eco-tourism and to maximize the positive impacts.
The number of organizations striving to accomplish this in Kashmir is growing rapidly, along with the popularity of eco-tourism itself, against the backdrop of the transition the state is experiencing.

One of the problems with the involvement of development NGOs in eco-tourism is that some forms of eco-tourism require that the development be based around non-consumption and rules out transformative development. Eco-tourism's popularity as a development option devalues human advancement by linking it to external, Western concepts of conservation priorities. Sometimes, conservation is emphasized more than development. Moreover, in some cases when the Western-orientated NGO approach to eco-tourism is based on a “strong” view of sustainability, the voice of the receiving communities is missing (Butcher, 2007). NGOs will continue to be engaged in ecotourism activities, in Kashmir and elsewhere. By comparing different kinds of NGOs (for example international – local), the NGOs themselves can more easily adapt to the current trends and achieve their goals in the best way. But most importantly, international and local NGOs should work together with and for the local communities.

Among the proposed 17 goals of sustainable development goals (SDGs), 4 goals are directly focusing on environment, eco system, biodiversity and water. Achieving the goals of sustainable development vis a vis environment and tourism with special reference to Jammu & Kashmir is only possible when we preserve and protect our environment by making ourselves and our younger generation aware about environment and ecology. Environmental education is a key driver for sustainable development and there is an urgent need of a greater coordination of Forest (including wildlife) and Tourism departments in J&K so that we can maintain the ability of our natural systems which further provide the natural resources, ecosystem and tourism services. Most of our state’s economy is dependent on natural resources and that is why there is a dire need to protect these resources. The role of Non Governmental Organizations (NGOs) is also of great importance while we work on development of our eco-tourism in Jammu & Kashmir. There are many experts in NGO sector who have a vast and in-depth knowledge in this field and their services should be availed by the Government. The recent move of the J&K Government to involve Eco-Tourism Society of India is a welcome step in this direction. Honorary Secretary of Eco-Tourism Society of India Rakesh Mathur who visited Srinagar recently to have discussion with Government about strengthening this sector indicates that Government is serious about making eco-tourism a reality in J&K. We hope government will not stop here as we have a very bad experience in past. The previous Government did not create the eco-tourism development board nor did it involve other stakeholders. We hope more and more people, NGO experts and stakeholders are involved in the process of making Jammu & Kashmir a hub of eco-tourism. We need to preserve our natural resources for future generation without causing any harm to the nature and its other components. Eco-tourism ties together concern for the carrying capacity of natural systems. The recent initiative taken by the Department of Environment Ecology and Remote Sensing by organizing first ever Forest Food Festival at Srinagar in collaboration with Centre for Conservation of Culture & Heritage (CCCH Trust) and Institute of Hotel Management (IHM) Srinagar is also being hailed by the people from Tourism sector. I hope many more forest food festivals are organized in other areas of our state so that people explore these herbs and start value addition of these products and market them commercially. J&K’s Tourism Ministry must make it sure that all the Tourism development authorities must create a cell in coordination with Forest, Environment and Wildlife Departments so that some small research is done locally on forest herbs etc. Various food items like Machran Chai, Pamb Haakh Sabzi, Wopal Haakh Parathas, Tethwan Pulao, etc can be prepared from locally available edible forest herbs and these food items should be made available at all those places where the foreign tourists visit (ibid, Daily Excelsior, 2015).

SUGGESTIONS
Following are the few recommendations suggested in order to balance the ecotourism through other sectors of the valley:

1. **Protected Area Personnel:** Since protected areas in Jammu and Kashmir are eco-tourism's primary "commodity", protected area personnel have to play a central role in eco-tourism development and management. Protected area personnel are usually the primary information resources concerning the flora and fauna in their areas. They also are the day-to-day caretakers of these natural resources and have the most responsibility for their immediate conservation.

2. **Local Communities:** Communities living around or in close proximity to protected areas in Jammu and Kashmir are frequently overlooked in tourism development and management. Sometimes this is because they are scattered and isolated making communication difficult. At other times the eco-tourism implementing agencies wish to avoid taking the time and effort to inform local communities of specific tourism development plans, or seek to marginalize them so as to deprive them of anticipated economic benefits. However, the needs of local communities should be taken fully into account, particularly since they are often dependent on the natural resources that attract tourists to an area. The planning process should initiate the development of mechanisms that ensure that local communities receive a share of the benefits of tourism development. But most especially, local communities should be consulted on what level of tourism development they consider is appropriate — both in their immediate environment and in the area as a whole. If their involvement is not sought, eco-tourism will certainly not be possible.

3. **Tourism Industry:** Tour operators have a great deal of influence on the destinations, activities and overall experience of tourists. It is therefore crucial that they understand the concept of eco-tourism and the conservation requirements of protected areas. They need to be fully aware that the eco-tourism product they are trying to promote is fragile and must be carefully preserved. The tourism industry is also an important partner since it is a vital source of information about demand trends, promotion and marketing.

4. **Financial Institutions:** If protected area management and local communities are to capture a greater share of the financial benefits of eco-tourism, most of them will be obliged to invest in development of infrastructure. Diverse funding sources will be essential. Banks, investment corporations, bilateral and multilateral international development agencies, and private investors could all have an important role in supporting, and providing initial financing for appropriate tourism planning and development. That is why so far this is one of the reasons why international development agencies like World Bank and Asian Development Bank, have set up environmental departments within their organizational structures and carry out environmental impact assessments before funding the projects.

5. **Consumers:** Eco-tourism's driving force consists of the consumers themselves. They decide where to go and what to do for recreation or vacation in protected areas. So their thoughts and preferences should be considered very seriously in any eco-tourism planning strategy. But they must be "educated" about the costs and benefits of eco-tourism to enable them to make wise travel decisions and actually participate in conservation efforts when they travel.

**REFERENCES**


