

IMPACT

The Future Makers



Vol. 6. 2019-2020

**Central Research Committee
Shri Shikshayatan College,
Kolkata**

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Shri Shikshayatan College, Kolkata**

IMPACT

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FROM THE EDITOR'S DESK

IMPACT is the journal of the Central Research Committee of Shri Shikshayatan College. Since its inception in March 2014, the committee has brought together the best Summer Project articles by students to be published in this journal.

IMPACT aims primarily to encourage research among our students, both at the undergraduate and post-graduate levels. It intends to initiate their interest in academic enquiry and provide a platform to showcase their efforts. The articles, ranging across the many disciplines taught at our institution, constitute an inter-disciplinary scholarly dialogue that celebrates the rich tradition of diversity cherished and nurtured by Shri Shikshayatan College.

This issue of IMPACT is a very special one. We are locked down by a pandemic that severely restricts our normal life. But even a global crisis cannot chain in the human mind and its thirst for knowledge. Our efforts to broaden our horizons continue unabated, and this new volume is testimony to our continued commitment to scholarly research.

Editorial Board
October 2020

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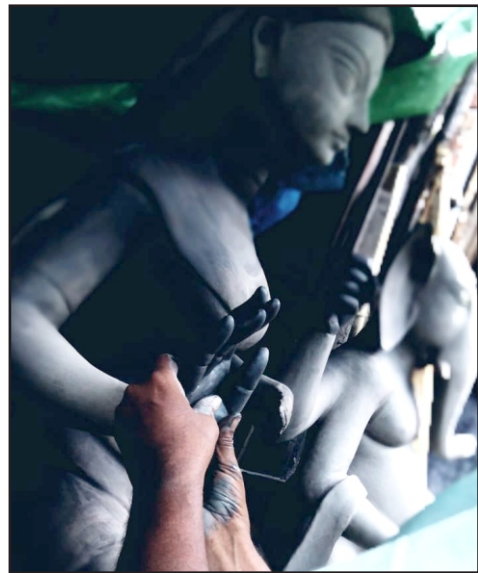
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বাংলা বিভাগ, সাম্মানিক – চতুর্থ সেমিস্টার



কিছু কথা

বাংলার হস্তশিল্পের মধ্যে একটি উল্লেখযোগ্য ও অত্যন্ত পুরাতন শিল্প হল মৃৎশিল্প। সহজ ভাষায়, মাটির তৈরি জিনিস কে মৃৎশিল্প বলা হয়। এই প্রকল্পে, মূলত কলকাতার অন্তর্গত কালীঘাট ও কুমোরটুলির মৃৎশিল্পের প্রকৃত অবস্থা এবং শিল্পীদের জীবিকা সম্ভাবনা ও সংকটের খোঁজ। মৃৎশিল্পের ইতিহাস ও বর্তমান পরিস্থিতি সম্পর্কে নানান তথ্য ও বিভিন্ন শিল্পীদের জীবনযাত্রা, অভিজ্ঞতা, কাজের পরিকল্পনা প্রভৃতি আমরা প্রখ্যাত শিল্পী ভাস্কর চিত্রকরের সাক্ষাৎকার এবং কালীঘাট ও কুমোরটুলির অন্যান্য মৃৎশিল্পীদের সঙ্গে কথা বলে, নির্দিষ্ট প্রশ্নাবলীর মাধ্যমে বিভিন্ন তথ্য সংগ্রহ করেছি। ভবিষ্যতে এই শিল্পকে সংরক্ষণ এবং মৃৎশিল্পের সম্ভাবনার দিক গুলি সকলের কাছে পৌঁছে দেওয়া যায়, সে বিষয়ে এই প্রকল্পে আলোচনা করা হয়েছে।

সূচকশব্দ : মৃৎশিল্প ও মৃৎশিল্পী, 'কুমোরপাড়া' (কুমোরটুলি ও কালীঘাট), সংরক্ষণ ও সম্ভাবনা।

ভূমিকা

কদিন আগেই নদীর পাশে মাটির তালটা কার জন্য অপেক্ষা করছিল। আর ঐ যে, খড়, বাঁশের কঞ্চিগুলো একরাশ ধুলো মেখে অবহেলিত হয়ে পড়েছিল, তারা মিলেমিশে সুসজ্জিত হয়ে লক্ষ লক্ষ মানুষের অঞ্জলি গ্রহণ করছে। মগুপে মগুপে শিল্প সৌন্দর্যের আকর্ষণ। যে জাদুকরের হাতে এই সৃষ্টি, তাদেরই কিছু কথা।

মৃৎশিল্প শব্দটি ‘মৃৎ’ এবং ‘শিল্প’ এদুটির মিলিত রূপ। মৃৎ শব্দের অর্থ মাটি বা মৃত্তিকা এবং শিল্প বলতে বুঝি সৃষ্টিশীলতা, এই দুই-এর সমন্বয়ে মৃৎশিল্প। মৃৎশিল্প হলো বিশেষ ঐঁটেলমাটি বা কাদামাটি, চীনামাটি ইত্যাদির সাহায্যে হাড়ি-পাতিল ও বিভিন্ন আসবাবপত্র তৈরি করার শিল্প, যাতে বস্তুগুলো টেকসই ও মজবুত করার জন্য উচ্চ তাপমাত্রায় পোড়ানো হয়। যারা মাটির বিভিন্ন জিনিসপত্র তৈরি করেন তাদেরকে কুম্ভকার বা চলিত বাংলায় কুমার (কুমোর) এবং যে কর্মশালাতে তারা এগুলি করেন তাকে কুম্ভশালা বা কুমারশালা (কুমোরশালা) বলা হয়।

কাদামাটি দিয়ে তৈরি মৃৎশিল্পকে তিন ভাগে ভাগ করা হয় : মাটির পাত্র, পাথুরে পাত্র ও পোসেলিন।

ঐতিহাসিক মৃৎশিল্পকে দুভাগে ভাগ করা হয় — ‘চারুকলামূলক মৃৎশিল্প’ (শৈল্পিক ছোঁয়ার পরিমাণ বেশি এবং সাধারণত গৃহস্থালির ব্যবহারের চেয়েও শোভাবর্ধনে বেশি ব্যবহৃত হয়) ও “কারিগরি মৃৎশিল্প” (সাধারণত ততটা নকশা করা থাকে না এবং গৃহস্থালির কাজে বেশি ব্যবহার হয়)।

সভ্যতার বিকাশের সঙ্গে সঙ্গে মানুষ তার প্রয়োজনীয় সামগ্রী তৈরির উপকরণ, প্রকৃতির কাছ থেকে সংগ্রহ করতে থাকে। তেমনি খাবার ও জল সংগ্রহ ও সংরক্ষণ করার জন্য পাত্র তৈরির ধারণা থেকে মাটির ব্যবহার শুরু করে মানুষ। এমনকি নিজেদের নিরাপত্তা নিশ্চিত করতে মাটির ঘর তৈরির সংস্কৃতি আদিকালে বিশ্বজুড়ে ছিল, যা আজও পৃথিবীর নানা প্রান্তে রয়েছে। তবে সভ্যতার বিকাশের সঙ্গে, মাটি দিয়ে তৈরি পণ্য শিল্পের ছোঁয়া পেতে থাকে। কালের পরিক্রমায় মানুষ নিজের সৃজনশীল চিন্তাকে অব্যাহতভাবে শাণিত করে এই শিল্পের ধারাবাহিক উন্নয়ন সাধন করে। বংশ পরিক্রমায় প্রজন্ম থেকে প্রজন্মান্তরে, পারিবারিকভাবে কুমোরদের মৃৎশিল্পে হাতেখড়ি ও প্রশিক্ষণ হয়ে থাকে। সমাজের যে জনগোষ্ঠী মৃৎশিল্পে আদিকাল থেকে যুক্ত তারা পাল বংশীয় হিসেবে পরিচিত।

মৃৎশিল্পে সেই জৌলুস ও চাহিদা এখন লুপ্ত প্রায়। প্রতিদিনই চাকা ঘোরাতে হয় কুমোরপাড়ার পরিবারের সদস্যদের। চাকার এক একটি পাকে চলে সংসার। কাঠের তৈরি চাকাটি কত পাক ঘুরছে, তাতেও তাদের ভাগ্যের চাকা মরচে ধরা। প্রযুক্তির হাওয়া বদল আর সহজলভ্যতায় মাটির তৈরি হাঁড়ি, বাসন-কোসনের প্রচলন দিনকে দিন হারিয়ে যাচ্ছে। শিল্পের প্রয়োজনীয় উপকরণের মূল্য বৃদ্ধিতে মৃৎশিল্পীরা হিমশিম খাচ্ছে। কুমোরদের দাবি — বিভিন্ন ব্যক্তি ও প্রতিষ্ঠানের পৃষ্ঠপোষকতায় এবং নানান উন্নয়নশীল সংস্থার সাহায্যে তারা এই শিল্পকে বাঁচিয়ে রাখতে পারবে।

দিন বদলের হাওয়ায় বদলে গেছে মৃৎশিল্পের আভিজাত্য। হারিয়ে যাচ্ছে মৃৎশিল্পের গৌরব, ঐতিহ্য। প্রকৃতিতে ছোঁয়া লেগেছে আধুনিকতার। ক্রমেই মানুষ মৃৎশিল্প থেকে সরে এসেছে। মৃৎশিল্পীরাও কাজ করার আগ্রহ হারিয়ে ফেলছেন। বাজারে মূল্য হ্রাস, আয়-ব্যয়ের সঙ্গতি না থাকায়, কাজ না থাকা অনেক মৃৎশিল্পী চলে গেছেন অন্য পেশায়। নতুন প্রজন্মের অনেকেই এই শিল্পের ঐতিহ্য সম্পর্কে কিছুই জানে না। দেশের বিভিন্ন জায়গায় মৃৎশিল্প মেলার আয়োজন করে নবীন প্রজন্মকে এই শিল্প সম্বন্ধে জানানো প্রয়োজন। না হলে মৃৎশিল্প স্থান লাভ করবে শুধুমাত্র মৃত ইতিহাসের পাতায়।



কুমোরটুলি

‘পটুয়াগাণ’ বা মৃৎশিল্পীদের বাসস্থান হিসেবে বিখ্যাত কুমোরটুলি অঞ্চলটি উত্তর কলকাতার আহিরীটোলা ও শোভাবাজারের মধ্যবর্তী অঞ্চলে অবস্থিত। ১৭৫৭ সালে পলাশীর যুদ্ধে জয়লাভের পর ব্রিটিশ ইস্ট ইণ্ডিয়া কোম্পানি গোবিন্দপুর গ্রামে ফোর্ট উইলিয়াম দুর্গ তৈরির সিদ্ধান্ত নেয়। এই অঞ্চলের বাসিন্দাদের সরিয়ে নিয়ে যাওয়া হয় সুতানুটি অঞ্চলে। গোবিন্দপুরের ধনী সম্প্রদায় পাথুরিয়াঘাটা ও জোড়াসাঁকো অঞ্চলে বসতি স্থাপন করে। এর পাশাপাশি গড়ে ওঠে অন্যান্য কয়েকটি অঞ্চলও।



কোম্পানির ডিরেক্টরদের আদেশে জন ঝোপানিয়া হলওয়েল কোম্পানির মজুরদের জন্য আলাদা আলাদা অঞ্চল ভাগ করেন দেন। এইভাবে কলকাতার স্থানীয় আধিবাসীদের বসবাসের স্থানগুলি বিভিন্ন পেশাভিত্তিক অঞ্চলে বিভক্ত হয়ে যায়। এইভাবেই শুঁড়িপাড়া, কলুটোলা, ছুতারপাড়া, আহিরীটোলা ও কুমোরটুলি প্রভৃতি অঞ্চলের উৎপত্তি ঘটে। ঊনবিংশ শতাব্দীর শেষভাগ থেকেই কুমোরটুলির পটুয়ারা, ধনী সম্প্রদায়ের বাড়ির

পুজোয় দেবদেবীর প্রতিমা গড়তে শুরু করেন। কলকাতা ও কলকাতার বাইরে বারোয়ারি বা সর্বজনীন পূজার প্রচলন হলে পূজাকর্মিটিগুলি কুমোরটুলি থেকে প্রতিমা সংগ্রহ করতে থাকেন।

কুমোরটুলির শিল্পীদের দুর্গাপ্রতিমার বিশেষ খ্যাতি রয়েছে। প্রতি বছর বিশ্বের ৯৩টি রাষ্ট্রে কলকাতার এই পটুয়াপাড়া থেকে প্রতিমা আনানো হয়। কুমোরটুলি অঞ্চলের নিজস্ব সর্বজনীন দুর্গাপূজার সূচনা হয় ১৯৩৩ সালে। সে যুগের বিশিষ্ট প্রতিমাশিল্পী গোপেশ্বর পাল ছিলেন কুমোরটুলি সর্বজনীনের প্রতিমার নির্মাতা।

বর্তমান যুগে ‘খিম শিল্পী’দের রমরমা সত্ত্বেও সনাতন প্রতিমার গুণগ্রাহী আজও কুমোরটুলি মৃৎশিল্পীদের দিয়ে প্রতিমা তৈরি করান।

কালীঘাট

বাংলার একটি ঐতিহাসিক জমিদার পরিবার, সাবর্ণ রায়চৌধুরীরা ব্রিটিশকে সুতানুটি দিয়ে দেওয়ার পর, গোবিন্দপুরে চলে আসেন। তাঁরা যেখানে থাকতেন সেখানে একটি কালী মন্দির ছিল। তাই এখানেও তিনি কালী মন্দির স্থাপন করেন। মন্দিরের নাম ডাক ছড়িয়ে পড়ার পর, ভক্ত সমাগম বাড়তে থাকে। জীবন ও জীবিকার টানে বহু



মানুষ মন্দিরের পাশে দোকান তৈরি করেন। তখন এখানে বসে বসে ছবি আঁকার চল শুরু হয়। গ্রামের পটুয়ারাও এই এলাকায় বসবাস শুরু করেন। উদ্দেশ্য তীর্থযাত্রীদের দেবদেবীর মূর্তি, পুতুল, সরাচিত্র বিক্রি করা। তীর্থ ভ্রমণের স্মৃতি হিসেবে তীর্থযাত্রীরা এইসব কিনে নিয়ে যেতেন। দরিদ্র পটুয়ারদের জীবিকার একটা দিক এইভাবে তৈরি হলো। গড়ে উঠল কালীঘাট পটুয়াপাড়া।

প্রকল্পের উদ্দেশ্য

১. বাঁধা ধরা সিলেবাসের গণ্ডির বাইরে বাংলার মৃৎশিল্প সম্পর্কে ধারণা এবং পরিচয়।
২. বাংলার ঐতিহ্যবাহী ধারা মৃৎশিল্পের বর্তমান অবস্থা ও পরিস্থিতি সম্পর্কে জানার চেষ্টা।
৩. মৃৎশিল্পীদের বর্তমানে কী অবস্থা তাদের কোন কোন সমস্যার সম্মুখীন হতে হয়, তার প্রতিকারই বা কী হতে পারে সে বিষয়ে তথ্য সংগ্রহ করা।
৪. ভবিষ্যতে এই শিল্পকে এগিয়ে নিয়ে যাওয়ার জন্য কী কী পদক্ষেপ নেওয়া যায়।
৫. অতীত থেকে বর্তমান এই শিল্পের মধ্যে কী কী পরিবর্তন এসেছে।

পদ্ধতি

এই প্রকল্পটিতে মূলত সাক্ষাৎকার ও সমীক্ষার ভিত্তিতে তথ্য সংগ্রহ করা হয়েছে।

প্রত্যক্ষ বা প্রাথমিক ও পরোক্ষ পদ্ধতিতে তথ্য সংগ্রহের মাধ্যমেই প্রকল্পের নির্মাণ।

১. প্রাথমিক (Primary) তথ্য সূত্র, ২. পরোক্ষ (Secondary) তথ্য সূত্র

১. প্রাথমিক তথ্য সূত্রে দুটি মাধ্যমে তথ্য সংগ্রহ করা হয়েছে (i) সাক্ষাৎকার এবং (ii) সমীক্ষার মাধ্যমে।

(i) বর্তমানে কালীঘাটের একমাত্র পটচিত্র শিল্পী ভাস্কর চিত্রকরের সাক্ষাৎকার গ্রহণের মাধ্যমে মৃৎশিল্প সম্পর্কে বিভিন্ন তথ্য সংগ্রহ করা হয়েছে।

(ii) কুমোরটুলি ও কালীঘাটের মৃৎশিল্পীদের নিয়ে মৃৎশিল্পের ওপর একটি সমীক্ষা করছে হয়েছে।

২. পরোক্ষ বা সেকেন্ডারি তথ্য সূত্রে সংগ্রহ করা হয়েছে মুদ্রিত ও প্রকাশিত তথ্য ভাণ্ডার থেকে :-

(i) বই (ii) ইন্টারনেট

সাক্ষাৎকার

কালীঘাটের প্রখ্যাত মৃৎশিল্পী ভাস্কর চিত্রকরের সাক্ষাৎকার নেওয়া একটি ডকুমেন্টারি — বংশ পরম্পরায় পাওয়া চিত্রকর উপাধি সঙ্গে নিয়ে, তাঁর হাতের জাদুতে মৃৎশিল্পে প্রাণের সঞ্চার করেছেন। শুধুমাত্র মৃৎশিল্পী হিসেবে নয়, মূর্তি গড়ার পাশাপাশি ছবি আঁকা, পটচিত্র অঙ্কন, বিভিন্ন স্কাঙ্কচার তৈরির কাজেও তাঁর দক্ষতা ও প্রতিভার পরিচয় পাওয়া যায়।



প্রঃ আপনি এই পেশায় কতদিন ধরে যুক্ত আছেন ?

উঃ বংশপরম্পরায় আমরা মৃৎশিল্পী। ছোটবেলা থেকেই দেখেছি বাবা এই পেশার সাথে যুক্ত ছিলেন আমি এবং আমার দাদা এই পেশাই বেছে নিয়েছিলেন। যদিও আমি আর এখন এই শিল্পের সাথে সেভাবে যুক্ত নই।

প্রঃ চিত্রকর-এর আগে আপনাদের কি পদবী ছিল ?

উঃ আমি জ্ঞান অবস্থা থেকে চিত্রকরই শুনে আসছি। আমার বাবার সময় থেকেই চিত্রকর নামে পরিচিত সবাই। এবার একেবারে আগে কি ছিল সেটা আমি বলতে পারবো না। আমার দাদু এই নামে পরিচিত ছিলেন। তাঁর নাম ছিল কোচিনাথ চিত্রকর।

প্রঃ কলকাতার কোন কোন জায়গাগুলিকে মৃৎশিল্পের কেন্দ্র বলা যেতে পারে ?

উঃ শোভাবাজার কুমোরটুলি, কালীঘাট পটুয়াপাড়া — এই জায়গাগুলিকে কলকাতার মৃৎশিল্পের কেন্দ্র বলা যেতে পারে।

প্রঃ মৃৎশিল্প বলতে কী বোঝায় ?

উঃ মৃৎশিল্প বলতে মূলত মাটির মূর্তি তৈরি করাকে বোঝায়।

প্রঃ ঠাকুর তৈরির ক্ষেত্রে ঠাকুরের মূর্তি অবয়ব তৈরির ধারণা কোথা থেকে পেয়েছেন ?

উঃ ভগবান তো নিরাকার। এটা মানুষের চিন্তা-ভাবনা। আমরা কালী বা দুর্গাকে তো কেউ দেখিনি। শিল্পী তার নিজস্ব ভাবনায় এঁদের রূপ দিয়েছেন। কোনো আর্টিস্ট যখন এঁকে নিয়ে আসেন তার মূর্তি কেমন হবে, আমরা সেই মত মূর্তি তৈরি করে দিই।

প্রঃ এই মাটির মূর্তি তৈরি করার পদ্ধতি কি ?

উঃ মাটির মূর্তি তৈরি করতে অনেক কিছু লাগে, যেমন — বাঁশ, খড়, মাটি, পেরেক, দড়ি, পাটের টুকরো। এর ধাপগুলো হল — প্রথমে বাঁশ বিভিন্নভাবে কেটে মূর্তির কাঠামো তৈরি করা হয়। তারপর খড় দিয়ে গঠন তৈরি করা হয়। খড়টাকে দড়ি দিয়ে বেঁধে কাঠামোকে ধরে রাখা হয়। এবার হাত-পায়ের পজিশন মতো বাঁশের টুকরো গজাল-এর মত করে আটকানো হয়। এবার এঁটেল মাটি লেপা হয় যাতে খড় আর দড়িটাকে ধরে রাখে। শুকিয়ে গেলে এর ওপরে আরেকবার

মাটি চাপানো হয়, যেটার সঙ্গে খড়কুটো মেশানো থাকে। আগে ধানের তুষ মেশানো হত। খড় ছোট ছোট করে কেটে ওর মধ্যে মিশিয়ে একটা আদল তৈরি করা হয়। সেটা শুকিয়ে যাওয়ার পর মুখ জোড়া হয়। ঠাকুরের মুখ তৈরি করে তারপর বেলে মাটি দেওয়া হয়। এটাই পুরো রূপটা দেয়। এবার এটা শুকোতে হয়। শুকোবার পর বেলে মাটিতে ফটল ধরে। তখন বেলে মাটি দিয়ে ফটলগুলো লেপতে হয়। লেপা হয়ে গেলে, এঁটেল মাটিকে দইয়ের মতো করে মেখে, সেটা সুতির পাতলা কাপড় দিয়ে ছাঁকা হয়। একদম দই হয়ে যায়। ওই সুতির কাপড়ের মত মাটিটা আবার ঠাকুরের গায়ে লেপা হয়। আর ফটল দেখা যায় না। তারপর আঙুল জোড়া হয়। এঁটেল মাটির সাথে পাট ছোট ছোট করে কেটে নেওয়া হয়, তাতে মাটি মজবুত হয়, এটা দিয়ে আঙুল তৈরি হয়। কাপড় বসানো হয়, তারপর রঙ করা হয়। উলুবেড়িয়া থেকে মাটি আসে আর বাঁশ আসে মুর্শিদাবাদ থেকে।

প্রঃ কুমোরটুলির মূর্তি আর কালীঘাটের মূর্তির মধ্যে পার্থক্য কোথায় ?

উঃ কুমোরটুলি প্রধানত মাটির ঠাকুরের জন্য বিখ্যাত। আর কালীঘাট পটুয়াপাড়া বিখ্যাত পট আঁকার জন্য। যখন পটের বাজার কমতে শুরু করল তখন মাটির মূর্তি তৈরি করা শুরু হলো। তাও একশো থেকে দেড়শো বছর হলো। আর কুমোরটুলি আরও আগে থেকে। শোভাবাজারের সাবর্ণরায়ের সময় থেকে।

প্রঃ আপনার সঙ্গে কি আরও লোক কাজ করে ?

উঃ ঠাকুরের কাজ একার দ্বারা হয় না। সবাইকে নিয়েই হয়।

প্রঃ ঠাকুরের চক্ষু দানের জন্য নির্দিষ্ট কোন শিল্পী থাকে ?

উঃ হ্যাঁ। চোখ দেবার জন্য নির্দিষ্ট শিল্পী থাকেন।

প্রঃ পটশিল্পের থেকে মৃৎশিল্পে এত বেশি উৎসাহ কেন ?

উঃ প্রিন্টিং বেশি হচ্ছে। তাই মৃৎশিল্পে এত বেশি উৎসাহ। (মুদ্রণের প্রচারে পটচিত্রের প্রতি মানুষের আগ্রহ কমে গেছে)।



সমীক্ষার ফলাফল

মৃৎশিল্প সম্পর্কে আরও ভালোভাবে জানবার জন্য কুমোরটুলি ও কালীঘাটের মৃৎশিল্পীদের সঙ্গে কথা বলে নির্দিষ্ট প্রশ্নাবলীর মাধ্যমে কিছু সময় বিভিন্ন তথ্য সংগ্রহ করা হয়েছে। কয়েকজন সাধারণ মৃৎশিল্পীর সঙ্গে কিছু প্রশ্ন-উত্তর ও কথোপকথনের মাধ্যমে মৃৎশিল্প ও শিল্পীদের বর্তমান পরিস্থিতি সম্পর্কে একটি সুস্পষ্ট ধারণা পাওয়া গেছে। এই সমীক্ষায় নিম্নলিখিত বিষয়গুলো আলোচনা করা হয়েছেঃ

১) নাম ২) বয়স ৩) নিবাস ৪) আদি নিবাস ৫) এই পেশায় কিভাবে এলেন? ৬) এই পেশার সাথে কতদিন ধরে যুক্ত? ৭) দিনে কতক্ষণ কাজ করেন? ৮) কাজের চাপ কোন সময় বেশি থাকে? ৯) এই পেশায় কোনো পরিবর্তন বা

আধুনিকতার প্রভাব এসেছে কি? ১০) যা উপার্জন হয়, তাতে সংসারের প্রয়োজন মেটে? ১১) সরকার থেকে কি কোনো সাহায্য পেয়েছেন? ১২) ঠাকুর বিসর্জনের সময় কি রকম অনুভব করেন?

সমীক্ষা থেকে পাওয়া তথ্য

মোট ৯ জন পুরুষ মৃৎশিল্পী ও ১ জন মহিলা মৃৎশিল্পীকে প্রশ্ন করা হয়েছিল, যাদের বয়স ২৭ থেকে ৬৫ বছরের মধ্যে। এদের সবার কর্মস্থলই বর্তমানে এদের বাসস্থান হয়ে উঠেছে — এই কুমোরটুলি এবং কালীঘাট। এদের মধ্যে ৪০% কলকাতার বাইরে বিভিন্ন জেলা থেকে কর্মসূত্রে এখানে এসেছেন ও বাকি ৬০% (শতাংশ)-এর আদি নিবাস এই কুমোরটুলি ও কালীঘাট। এদের মধ্যে ৩০% বংশ পরম্পরায় এই পেশার সাথে যুক্ত হয়েছেন এবং বাকি ৭০% নিজের ইচ্ছায় এই পেশায় এসেছেন। এদের মধ্যে ৪০% ৫ বছর থেকে ৮ বছর এই পেশার সঙ্গে যুক্ত। বাকি ৬০% ১০ বছরের বেশি সময় ধরে এই পেশায় রয়েছেন। এদের মধ্যে ২০% দৈনিক ৮ ঘন্টা কাজ করেন এবং বাকি ৮০% দৈনিক ১০ ঘন্টার বেশি কাজ করেন। প্রত্যেকেই জানিয়েছেন দুর্গা ও কালী পূজার সময় কাজের চাপ সবথেকে বেশি থাকে। প্রত্যেকেই বলেছেন এই পেশায় আধুনিকতার প্রভাব এসেছে। রঙ থেকে শুরু করে, শোলা ও ডাকের সাজে পরিবর্তন এসেছে। এখন তেল রঙ ও স্প্রে রঙ বেশি ব্যবহার করা হয় এবং অর্ডার অনুযায়ী মূর্তি গড়ে দেওয়া হয়। এদের মধ্যে ২০% জানিয়েছেন যা উপার্জন হয় তাতে সংসার ভালোভাবেই চলে যায় এবং ৮০% জানিয়েছেন, ওভারটাইম করে সংসার কোনরকমে চলে। প্রত্যেকেই জানিয়েছেন তাঁরা সরকার বা বেসরকারি প্রাতিষ্ঠানিক সাহায্য সেভাবে কিছু পাননি। সকলেই বলেছেন, বিসর্জনের সময় একটু খারাপ লাগলেও এই চিরাচরিত প্রথার সাথে তারা নিজেদেরকে মানিয়ে নিয়েছেন।



আলোচনা

এই প্রকল্পে আমরা কুমোরটুলি ও কালীঘাটের মৃৎশিল্প ও মৃৎশিল্পীদের সম্পর্কে বিভিন্ন রকম অভিজ্ঞতা অর্জন করতে পেরেছি। তাদের সঙ্গে কথা বলে আমরা জানতে পারি, সমাজে মৃৎশিল্প অনেকাংশে লুপ্ত হয়ে যাচ্ছে। তাই এখন তাদের বর্তমান পরিস্থিতি সঙ্কটাপন্ন। আধুনিকতার যাঁতাকলে পিষে গিয়ে, আগের তুলনায় মৃৎশিল্পের চাহিদা হ্রাস পেয়েছে। এখন শুধু পূজোর সময় কাজের বৃদ্ধি হয়, তাও বর্তমানে থিম পূজো প্রচলনের ফলে প্রতিমা গড়ার সেই সাবেকি স্পর্শ লুপ্ত হচ্ছে। কারিগরের সংখ্যাও কমছে, এই কাজ ছেড়ে

আরও নানা রকমের কাজে তারা যোগদান করছে বাধ্য হয়েই।

সমাজের মৃৎশিল্প লুপ্ত হয়ে যাওয়ার অন্যতম কারণ হল আজকের মানুষ ভুলে যাচ্ছে কুমোরের হাতে তৈরি জিনিসগুলি, যেমন মাটির হাঁড়ি, কলসি, বাচ্চাদের খেলনা পুতুল এবং আরো বিভিন্ন জিনিস। বর্তমানে প্লাস্টিকের চাহিদা

বেড়ে যাওয়ার বৃদ্ধির ফলে মাটির তৈরি জিনিসের জনপ্রিয়তা কমে আসছে, তাই সমাজে মৃৎশিল্প ততটা গুরুত্ব পাচ্ছে না। মৃৎশিল্পের চাহিদা বৃদ্ধি করার জন্য আমাদের মৃৎশিল্পের ‘এসেন্স’, নিজস্ব সৌন্দর্য সকলের কাছে পৌঁছে দিতে হবে। মানুষকে বুঝাতে হবে যে মাটির জিনিস পরিবেশ বান্ধব। প্লাস্টিকের বদলে মাটির জিনিসের ব্যবহার বাড়াতে পারলে যেমন মৃৎশিল্পের সংকট কমবে, পরিবেশ এবং মানুষের স্বাস্থ্যের পক্ষেও তা’ উপকারী। সরকারকেও বিভিন্ন পদক্ষেপ নিতে হবে — মৃৎশিল্পীদের আরো আগ্রহী করে তুলতে হবে তাদের পেশায়। বিভিন্ন সুযোগ সুবিধার মাধ্যমে মৃৎশিল্পের বাণিজ্যিক সাফল্যের দিকটাও লক্ষ্য করতে হবে। তবে তার জন্য মৃৎশিল্পেরও সময়োপযোগী আধুনিকীকরণ প্রয়োজন, যাতে ক্রেতারাও আগ্রহী হয় এই শিল্পের প্রতি। তাহলেই আবার নতুন করে বেঁচে উঠবে মৃৎশিল্প, তৈরি হবে শিল্পজাত ও বাণিজ্যিক নতুন সম্ভাবনা।

কৃতজ্ঞতা স্বীকার

প্রকল্পের পরিকল্পনা ও রূপায়ণে সাহায্য পেয়েছি আমাদের বাংলা বিভাগের। কাজ করতে গিয়ে আমরা কুমোরটুলি ও কালীঘাটের মৃৎশিল্প এবং মৃৎশিল্পীদের কাজ এবং জীবিকা সম্পর্কে বিভিন্ন তথ্য জানতে পেরেছি। এই প্রকল্পটি প্রখ্যাত মৃৎশিল্পী ভাস্কর চিত্রকরের মূল্যবান সাক্ষাৎকার, পরামর্শ, তথ্য ছাড়া অসম্পূর্ণ থাকতো। অত্যন্ত ব্যস্ততার মধ্যেও গুঁর মূল্যবান সময় আমাদের প্রোজেক্টের জন্য দিয়েছেন, তাঁর জন্য আমাদের কৃতজ্ঞতা ও শ্রদ্ধা। কুমোরটুলি ও কালীঘাটের বিভিন্ন মৃৎশিল্পীরা কাজের ব্যস্ততার মধ্যে আমাদের প্রশ্নের উত্তর দিয়েছেন — তাঁদের কাজ সম্পর্কে জানিয়েছেন, কাজের ছবি তোলার অনুমতি দিয়েছেন। তাঁদেরকে ধন্যবাদ জানাই।

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AQUASCAPE : A NEW APPROACH TO EX SITU CONSERVATION VIA BIOREMEDIATION

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Synopsis of a Wildroots Project

ABSTRACT

Depletion of natural resources and habitat destruction has led to changes in ecosystems from global to the local scale. For this reason, numerous theories and methods from landscape ecology have emerged and applied in sustainable landscape planning and designs like aquascaping. Aquascaping is the skill of arranging aquatic plants, as well as rocks, stones, cave works, driftwood, etc. BIOTOPE .Aquascaping style is an exact replica of a specific natural aquatic landscape, capable approach in creating a sustainable environmental design. Growing an endangered native species in an AQUASCAPE medium can be filtered by PHYTOREMEDIATION (using water hyacinth/ Duckweed). Phytoremediation is the most promising option to combat Eutrophication and pollution problems in rural areas. Duckweed holds immense potential for nutrients recovery and utilization as fodder or feed for livestock including fish. Waste water Duckweed aquaculture is an eco-friendly integrated package for converting the waste water nutrients into high quality fish protein and augmenting rural economy. In our present study we propose two aquascaping models, first Bioremediation and Filtration of Ganga water with water hyacinth and second to conserve endangered native species by using the filtered Ganga Water. Hence we have tried to show BIOTOPE as a mode of ex-situ conservation, providing protection for rare and endangered species.

Key Words: Aquascaping, Phytoremediation, conservation, water quality.

INTRODUCTION

Depletion of natural resources and habitat destruction has led to changes in ecosystems from global to the local scale. For aquatic habitats, rise in toxicity level has become a major cause of concern. Hence, many common aquatic species are either heading towards endangerment, or have already been marked as Endangered (EN) or Vulnerable (VU) by the IUCN. As a solution to this, **AQUASCAPING** is a mode of ex-situ conservation, to save those species.

OBJECTIVE :

Coming to **West Bengal**, Biodiversity conservation is identified as one of the key operational objectives and targets for sustainable development strategy for growth and jobs. Fishing in fisheries

tidal estuaries, rivers, creeks, and vast estuarine wetlands are very important in terms of rural economic set up and supply of cheaper protein food to the neighboring states. **Hence, the endangerment of fishes is a big threat to the economy of the state.** So, both in-situ and ex-situ conservation of species is important to combat the biodiversity loss, which is achieved by Aquascaping and Bioremediation.

On the other hand, **BIOREMEDIATION** can be a solution for the increasing toxicity levels in water bodies.

Cause of endangerment :A list of critically endangered fish, prepared by the **West Bengal University of Animal and Fisheries Sciences (WBUAFS)**, Kolkata, includes varieties that were extremely common till a decade ago - fal, chang, lata, shol, chanda and even koi and mourala. It is a threat to the ecosystem and biodiversity, and to nutritional security. One of the major reasons behind the extinction of these species was the reduction in the number of paddy fields around water bodies.

Most of these fish breed in flooded paddy fields during the rainy season. Use of fertilizers and pesticides, loss of spawning ground and also and drying up of canals was also responsible.

METHODOLOGY

Aquascaping, first introduced by Takashi Amano, is the skill of laying out aquariums, ponds or lakes with hardscapes like rocks, stones and wood, as well as species of plants, thus creating a replica of nature.

The aim of aquascaping is to create a suave underwater panorama. The technical aspects of tank preservation and the increasing requirements of aquatic flora are also taken into consideration. Many factors ought to be balanced inside the closed system of an aquarium tank to make sure the success of an aquascape. These factors encompass filtration, preserving carbon dioxide at tiers, enough to assist photosynthesis underwater, substrate and fertilization, lights, and manipulate algae.

***Cyprinus carpio* (common carp / 'koi') : A vulnerable fish is chosen for conservation.**

Kingdom: Animalia

Phylum: Chordata

Class: Actinopterygii

Order :Cypriniformes

Family :Cyprinidae

Genus :*Cyprinus*

Species :*C. carpio*

Habitat: Freshwater environment, especially ponds, lakes, rivers.

Why *Cyprinus carpio*?

Cyprinus carpio is considered to be a very important aquaculture species because :

- It affects the **aerobic decomposition of organic matter** and nutrient availability in the water column via bioturbation of benthic sediment during feeding on benthic organisms. If the density of common carp is not excessive, an increase in nutrient availability may enhance photosynthesis and **plankton production**. Therefore, the density of common carp is a very important factor that has a great effect on the aquatic ecosystem.
- It contributes significantly to the **nutritional as well as livelihood security of the rural mass**. They are nutrient dense and a rich source of micronutrients like **copper, zinc, selenium, iodine, magnesium, iron, cobalt, and chromium, and macro minerals like calcium and phosphorus**. They are rich in vitamins, particularly **vitamin A, D and E as well as vitamins B1, B2 and B3**.

The Aquascape is designed in the following way :

Step 1: Planning the Layout

An ideal size (100 gallons) aquarium is planned, as required to create a replica for the carp to thrive and co-exist. An ideal tank for carp is 8x6 ft (2.43x1.82 m) and at least two feet (60.96 cm) deep.

Step 2: Choosing and adding substrate :

Carp are mainly bottom dwellers but search for food in the middle and upper layers of the water body. Typical 'carp ponds' are shallow, eutrophic ponds with a muddy bottom and dense aquatic vegetation at the dikes. Alluvial soil is added.

Step 3 : Hardscaping :

Adding some natural driftwoods help to maintain pH balance in the water.

Step 4: Light : Special AQUA DESIGN AMANO (ADA)

Light is used to provide the same spectrum as the sunlight. The light intensity is controlled throughout the day, with respect to varying intensities of the sunlight. A cheaper alternative would be keeping the aquarium out in the open, but away from direct **sunlight** exposure.

Step 5: Planting the Aquarium

Plants should be placed into the substrate using tweezers and should be pushed down about an inch into the soil to prevent them from breaking loose and detaching.

Bristle brushes, Lilly pads, or spawning sponges are added as a source of oxygen and also provide shade to the carp. Aquatic weeds (*Ceratophyllum*, *Myriophyllum*) are essential for the carp during spawning.

Step 6: Adding the Water

The water should be added carefully so as not to displace the substrate. A small bowl is placed on top of substrate and water is gently poured in it. The aquarium can also be filled slowly using a very

thin siphon. Once a week, around 10-20% of the water from the tank is drained out and replaced with dechlorinated fresh water.

Step 7: Cycle the Aquarium

Upto 6 weeks is allowed for the aquarium to complete the **nitrogen cycle**.

This allows for the development and growth of beneficial bacteria which aid in converting ammonia and nitrites which can kill any fish that is placed in the tank.

Step 8 :Carbon dioxide source :

Plants in the tank take in the carbon dioxide released by animals. Thus, a gaseous balance is maintained.

Step 9 :Setting up idea growth conditions for the carp :

pH 6.5-9; **Temperature** : 23-30°C; **Salinity** : 5% ; **Oxygen concentration** : The species can survive low oxygen concentration (0.3-0.5 mg/litre) as well as supersaturation.

Step 10 :Filtration :

The flow in a densely planted aquarium should be sufficient to ensure a good nutrient transport for the provision of the aquatic plants. **Polcher** helps in filtration by creating vibrations and purifies water. **Tourmaline**, a natural crystal is used to maintain high level of static electricity.

Duckweed is also used to filter the tank water. **Pumps** and **skimmers** are some of the mechanical filters .

Step 11: Microorganisms :

Super 4 (a bacterial concoction) ,**Bacter-100** are used for this purpose. **Clear super**, a very high activated carbon, helps useful bacteria survive. **Pumice stone**/ porous soil/ powder sand is used for growth of bacteria, since it provides large amount of surface area. It is also important to maintain aeration and seepage.

Step 12: Adding the fishes :

The fish to be conserved (**Cyprinus carpio**) is added to the aquarium along with other fishes (barbs, catfish, goldfish etc.) insects, protozoa, algae, etc. in order for it to be able to co-exist.



SCHEMATIC REPRESENTATION OF MAKING OF AN AQUASCAPE

Adding food for the fishes :Carp are omnivorous, and consume water insects, larvae of insects, worms, molluscs, **zooplankton**, and also the stalks, leaves and seeds of aquatic and terrestrial plants, **decayed aquatic plants**, etc. The tank should be inoculated with **Moina or Daphnia**. **Supplementary feeds**, such as soybean meal, cereals meals, meat meal, or mixtures of these materials, should be applied. Rice bran or rice polishings can also be used for feeding fry.

Controlling the algae :

The **Amano shrimp** (*Caridinamultidentata*) is added to control the growth of algae in the tank.

Ideal conditions for growth and maintenance of the carp :

The pond farming of carp is based on the ability of the species to accept and utilize cereals supplied by the farmers. The daily growth of carp can be 2 to 4 percent of body weight. Asian strains start to spawn when the ion concentration of the water decreases abruptly at the beginning of the rainy season. Carps generally spawn on nests, **aquatic weeds (Ceratophyllum, Myriophyllum)** and inundated grass in tanks and ponds.

Wild carps are partial spawners. Domesticated carps release all their matured eggs within a few hours. After hormonal treatment carp release their ripe eggs within a much shorter period, which makes stripping possible. The quantity of released eggs is 100 to 230 g/kg body weight. The egg shell becomes sticky after contacting water.

The embryonic development of carp takes about 3 days at 20-23 °C (60-70 degree-days). Under natural conditions, hatched fry sticks to the substrata.

Nursing of common carp

Shallow, aquatic weed-free drainable aquariums are the most suitable for carp nursing. Tanks must be prepared before stocking to encourage the development of a rotifer population, since this constitutes the first food of feeding fry. The stocking density is 100-400 fry/m². The length of the nursery period is 3 to 4 weeks. The final fish weight is 0.2-0.5 g. The survival rate is 40-70 percent. For large scale, tanks of 5-100 m² surface area, made of concrete, bricks or plastic, can be used for nursing fry up to 1-2 cm in size. By applying hay and manure, dense populations of Paramecium and rotifers can be established in these tanks. A few hundred fry per m² can be stocked.

DISCUSSION

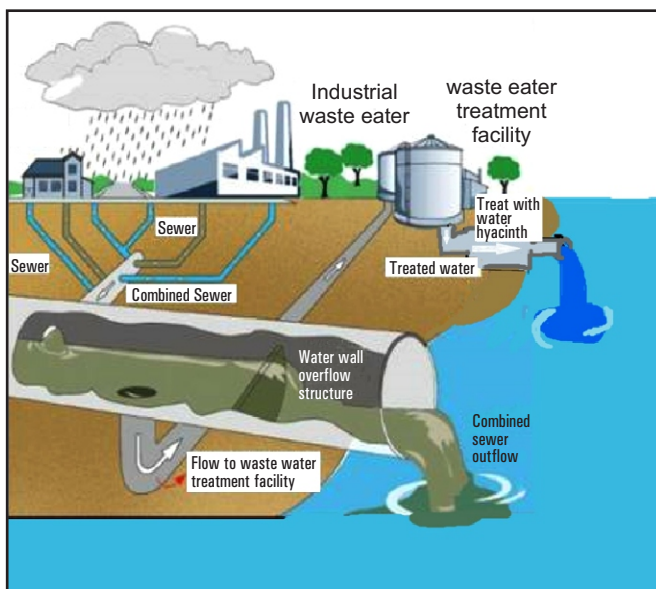
Industrial waste containing **toxic chemicals** and heavy metals like **lead, cadmium**etc. , are often released into water bodies without adequate treatment.

Inspired by the use of **Duckweed** in aquascaping (in filtration) ,**waterhyacinth(Eicchorniacrassipes)** can be used as a way of phytoremediation to treat the industrial waste water joining water bodies. The **roots** of this weed provides a suitable environment for aerobic bacteria to remove various impurities in water.

A **buffer zone** with water hyacinth, is created through which the waste water would be treated

before being released into the water bodies. Thus, **biomagnification** and lethal effects on animals drinking this water can be removed.

Aquatic species restoration and identification of indicator species that monitor ecological health, to be performed. The local communities should be educated about the value of aquatic biodiversity.



PROPOSED MODEL FOR DISPOSAL OF WASTE WATER BY INDUSTRIES USING BIOREMEDIATION

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ESTIMATION OF VITAMING IN DIFFERENT FRUIT JUICES

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Department of Chemistry

Introduction:

Vitamin C is also known as ascorbic acid or L-ascorbic acid or simply ascorbate (the anion of ascorbic acid), hexuronic acid or and cevitamic acid.

❖ Why is Vitamin C important for us in our body?

Vitamin C is a water soluble substance that is regarded as one of the safest and most effective nutrients that plays a vital role in protecting the body from infection and disease. It is needed for the formation of collagen, the protein that makes up connective tissue, and is essential to muscles, bones cartilages, blood vessels, capillaries, tissues, skin and teeth. It also functions in the absorption of iron, reduction of plasma cholesterol level, inhibition of nitrosoamine formation and enhancement of the immune system. It reacts with singlet oxygen and other free radicals neutralizing them. Vitamin C is a cofactor in at least eight enzymatic reactions. Ascorbic acid is also widely used as a food additive.

As an antioxidant, it forms part of the body's defense system against reactive oxygen species & free radicals, thereby preventing tissue damage, it reportedly reduces the risk of arteriosclerosis, cardiovascular diseases, infectious diseases, asthma, cataract, Diabetes Mellitus and some forms of cancer. It is widely used in the treatment of certain diseases such as scurvy, common cold, anemia, hemorrhagic disorders, wound healing as well as infertility (Jacob et al., 2002).

❖ What are the natural sources of Vitamin C?

Vitamin-C can be found in most fruits and vegetables. Except human and other primates most of the phylogenetically higher animals can synthesize Vitamin C (L-ascorbate) on their own. More than 90% of the Vitamin C in human diets is known to be supplied by fruits and vegetables (including potatoes).

Citrus fruits and juices are particularly rich sources of Vitamin C but other fruits including cantaloupe and honeydew melons, cherries, kiwi fruits, mangoes, papaya, strawberries, tangelo, tomatoes, and watermelon are also good sources and are known to contain variable amounts of Vitamin C (Chowdhury et al. 2016).

❖ Why is it important to estimate Vitamin C?

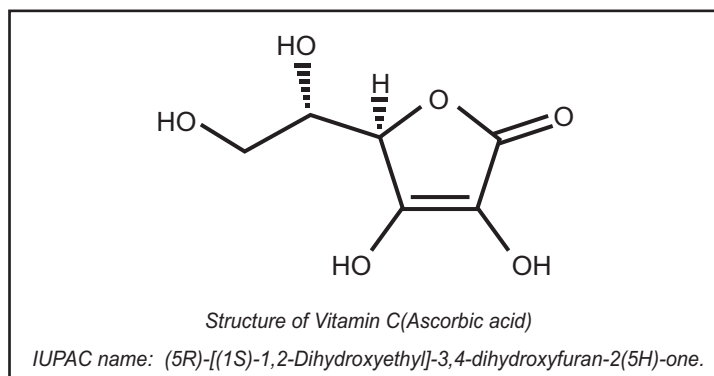
The citrus fruits are the richest known sources of Vitamin C. They are associated with anti-oxidant, anti-inflammatory, anti-tumor, anti-fungal and blood clot inhibition activities. The consumption of citrus juices is found to be beneficial in preventing coronary diseases and

chronic asthma (Aguilera et al. 2016). It is also found that the regular consumption of citrus fruit juices protects the organisms from oxidative stress. So, over the last decades, the medicinal benefits of citrus fruits have also been discovered besides the anti-scurvy property (Food standards agency, 2007).

In our country India, about 70% of the population are known to live in poverty. All of them are unable to purchase expensive fruits like orange to fulfil their Vitamin C requirements. So they can consume other substitute fruits for overcoming the problem of Vitamin C deficiency.

❖ Chemical nature and structure of Vitamin C

Vitamin C or **Ascorbic acid** is an organic compound with formula $C_6H_8O_6$. It is a white solid, but impure samples can appear yellowish. It dissolves well in water to give mildly acidic solutions. It is a mild reducing agent. Ascorbic acid exists as two enantiomers (mirror-image isomers), commonly denoted “L” (for “levo”) and “D” (for “dextro”). The L isomer is the one most often encountered (Abeyasinghe et al., 2007).



The ascorbate ion is the predominant species at typical biological pH values. It is a mild reducing agent and an antioxidant. It is oxidized with loss of one electron to form a radical cation and then with the loss of a second electron to form dehydroascorbic acid. It typically reacts with oxidants of the reactive oxygen species

category, such as the hydroxyl radical (Padayatty et al., 2003, Aboul-Enein et al., 1999).

❖ Different methods available to estimate Vitamin C :

Numerous analytical techniques are available for the determination of Vitamin C in different materials. Some of the techniques include: direct titration, fluorometric, chromatographic and electrochemical methods (Nweze et al. 2015). However, some of these methods are time-consuming, some are costly, some need special training operators, or they suffer from the insufficient sensitivity or selectivity. In this research titration method was used because it is a less costly but accurate and a precise method to determine Vitamin C compared to other methods as high pressure liquid chromatography (HPLC) method and enzymatic methods (Okiei et al; 2009).

As this project was done in a UG College, keeping in mind the cost and expenses, we chose to carry out the titration method. There are several titration methods available using various substances like Indophenol (Mau et al. 2005), iodine (Nweze et al. 2015) etc. We chose iodometric titration method for its ease and suitability.

Aim of the study:

The objective of the study is to determine Vitamin C content in four commonly available fruits (lemon, orange, 'mausambi' and lime) and to compare their relative percentages.

Methods of estimation:

The method of estimation was based on iodometric titration (S.C. Das, Advanced Practical Chemistry, 6th ed.)

Chemicals required:

1. $K_2Cr_2O_7$
2. $Na_2S_2O_3$
3. Starch
4. Iodine
5. 4(N) H_2SO_4
6. 10% KI

Apparatus required

1. Volumetric flask
2. Pipette
3. Burette
4. 100ml beaker
5. 10ml & 25ml measuring cylinder
6. Conical flask

Working formula: $V_1S_1 = V_2S_2$ was used to calculate the strength of Vitamin C (Where 'V' terms represent volume and 'S' terms represent strength/concentration).

Procedure:

1) Standard (N/20) $K_2Cr_2O_7$ solution was prepared by accurate weighting.

2) Standardization of the supplied $Na_2S_2O_3$ solution Vs standard (N/20) $K_2Cr_2O_7$ solution.

10 ml standard (N/20) $K_2Cr_2O_7$ solution was pipetted out in a 250 ml conical flask. 4ml of 4N H_2SO_4 , 6ml of 10% KI solution was added and covered. The flask was allowed to stand in the dark for three minutes. The contents of the flask were diluted with 40 ml of distilled water and the liberated iodine was titrated with thiosulphate solution till the solution became pale yellow. 1 ml of 1% starch solution was added and the titration was continued until blue colour was just discharged.

3) Standardization of the iodine solution against standardized $Na_2S_2O_3$ solution.

10 ml of supplied iodine solution was pipetted out in a 250 ml conical flask and diluted with 40ml distilled water and titrated with the standard (N/20) thiosulphate solution till pale yellow colour. 1 ml of 1% starch solution was added and the titration was continued until the blue colour was discharged.

4) Estimation of Vitamin C in the supplied solution.

10ml of the stock solution of the fruit juices was pipetted out in a 250 ml conical flask and 10ml distilled water was added to it . Then 1ml 4(N) H_2SO_4 was added to adjust the pH. 20ml of measured excess standard (N/20) iodine solution was added with a pipette , The flask was allowed to stand in the dark for 3 minutes and then it was titrated with sodium thiosulphate till pale yellow. 1ml of 1% starch solution was added, the solution turns blue, the titration was continued till the blue colour was discharged.

Results:

Table 1:-standardisation of $Na_2S_2O_3$ with $K_2Cr_2O_7$

No. of obs.	Volume of $K_2Cr_2O_7$ (ml)	Volume of $Na_2S_2O_3$ (ml)	Mean volume	Strength Of $K_2Cr_2O_7$ Used (N)	Strength of $Na_2S_2O_3$ (N)
1.	10	10			$10.0 * x = 10.0 * 0.0497$
2.	10	10	10	0.0497	$X = 0.0497$ (N)
3.	10	10			

Table 2:-Standardisation of iodine solution

No. of obs.	Volume of Iodine (ml)	Volume of $Na_2S_2O_3$ (ml)	Mean volume	Strength Of $Na_2S_2O_3$ Used (N)	Strength of Iodine Soln. (N)
1.	10	10			$10.0 * x = 10.0 * 0.0497$
2.	10	10	10	0.0497	$X = 0.0497$ (N)
3.	10	10			

Table 3:-Estimation of Vitamin C in lemon juice:

No. of obs.	Volume of Lemon Juice (ml)	Volume of $Na_2S_2O_3$ (ml)	Mean volume	Strength of thio Used (N)	Strength of Vitamin C in lemon juice (N)
1.	10	9.7			0.0506
2.	10	9.9	9.8	0.0497	
3.	10	9.8			

Calculation:

$$9.8 * 0.0497 = V * 0.0497 \Rightarrow V = 9.8 \text{ ml}$$

20 ml of iodine was added in excess.

Therefore; $(20 - V) = 20 - 9.8 = 10.2 \text{ ml}$ iodine reacted with Vitamin C

$$10.2 * 0.0497 = 10.0 * S \Rightarrow S = 0.0506 \text{ (N)}$$

Now; 1000ml of sodium thiosulphate = 88.06gm of ascorbic acid

$$S * 88.06 = 0.0506 * 88.06 = 4.455 \text{ gm/lit.}$$

Therefore, the strength of Vitamin C in lemon juice is 4.455gm/lit.

Table 4:- Estimation of Vitamin C in orange juice:

No. of obs.	Volume of Orange Juice (ml)	Volume of Na ₂ S ₂ O ₃ (ml)	Mean volume	Strength of thio used (N)	Strength of Vitamin C in orange juice (N)
1.	10	11			0.0427
2.	10	11.4	11.3	0.0497	
3.	10	11.5			

Calculation:

$$11.4 \times 0.0497 = V \times 0.0497 \Rightarrow V = 11.4 \text{ ml}$$

20 ml of iodine was added in excess

Therefore; $(20 - V) = 20 - 11.4 = 8.6 \text{ ml}$ iodine reacted with Vitamin C

$$8.6 \times 0.0497 = 10.0 \times S \Rightarrow S = 0.0427 \text{ (N)}$$

Now, 1000ml of sodium thiosulphate = 88.06gm of ascorbic acid.

$$S \times 88.06 = 0.0427 \times 88.06 = 3.760 \text{ gm/lt.}$$

Therefore, the strength of Vitamin-C in orange juice is 3.760gm/lt.

Table 5:-Estimation of Vitamin c from 'mausambi' juice:

No. of obs.	Volume of Mausambi Juice (ml)	Volume of Na ₂ S ₂ O ₃ (ml)	Mean volume	Strength of thio used (N)	Strength of Vitamin C in Mausambi juice (N)
1.	10	12.3			0.038
2.	10	12.4	12.4	0.0497	
3.	10	12.5			

Calculation:

$$12.4 \times 0.0497 = V \times 0.0497 \Rightarrow V = 12.4 \text{ ml}$$

20 ml of iodine was added in excess

Therefore; $(20 - V) = 20 - 12.4 = 7.7 \text{ ml}$ iodine reacted with Vitamin C

$$7.7 \times 0.0497 = 10.0 \times S \Rightarrow S = 0.038 \text{ (N)}$$

Now, 1000ml of sodium thiosulphate = 88.06gm of ascorbic acid .

$$S \times 88.06 = 0.038 \times 88.06 = 3.346 \text{ gm/lt.}$$

Therefore, the strength of Vitamin-C in 'mausambi' juice is 3.346gm/lt.

Table 6:-Estimation of Vitamin C in lime juice:

No. of obs.	Volume of Lime Juice (ml)	Volume of Na ₂ S ₂ O ₃ (ml)	Mean volume	Strength of thio used (N)	Strength of Vitamin C in Lime juice (N)
1.	10	13.4			0.032
2.	10	13.3	13.4	0.0497	
3.	10	13.5			

Calculation:

$$13.4 \times 0.0497 = V \times 0.0497 \Rightarrow V = 13.4 \text{ ml}$$

20 ml of iodine was added in excess

Therefore; $(20 - V) = 20 - 13.4 = 6.6 \text{ ml}$ iodine reacted with Vitamin C

$$6.6 \times 0.0497 = 10.0 \times S \Rightarrow S = 0.032 \text{ (N)}$$

1000 ml of sodium thiosulphate = 88.06 gm of ascorbic acid.

$$S \times 88.06 = 0.032 \times 88.06 = 2.817 \text{ gm/lt.}$$

Therefore, the strength of Vitamin-C in lime juice is 2.817 gm/lt

The above data indicated that the relative Vitamin C concentration in the four fruit juices under consideration is in the order Lemon juice > Orange Juice > Mausambi > Lime juice.

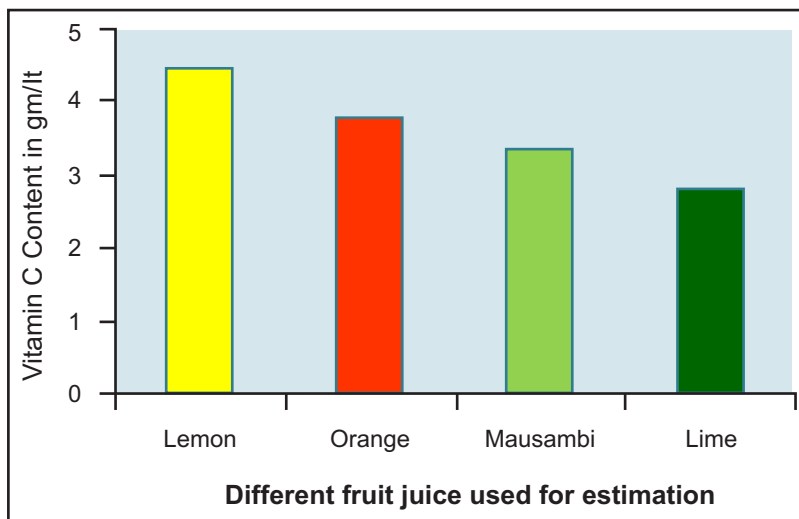


Fig. Relative Vitamin C contents in the citrus fruits used

Discussion:

A total of four fruits were studied. Vitamin C content of the four types of citrus fruits are given above. Our study revealed that lemon juice has greater amount of Vitamin C than orange. Orange has Vitamin C content more than *mausambi*. Again *Mausambi* has more Vitamin C concentration than lime. So we can infer that lemon contains the greatest amount of Vitamin C and lime has the least amount of Vitamin C.

From the column of their average titres, it could be seen that the lower the titre value, the greater is the quantity of Vitamin C. Thus, the quantity of Vitamin C present in the given sample of a fruit has an inverse relation with the titre value. Now, this may be attributed to the fact that in the lemon juice sample, after all the ascorbic acid had reacted with the iodine solution, the remaining iodine solution left to react with the sodium thiosulphate solution was so little that little volume of the titrant (sodium thiosulphate) was consumed. However, in the lime sample, after all the ascorbic acid had reacted

with the iodine solution, the remaining iodine solution left to react with the sodium thiosulphate solution was so much that much volume of the titrant was consumed. This method is also applicable to other fruits including vegetables (Odeyemi et al. 2019).

However it should be taken into consideration that differences in the values of ascorbic acid may be observed as a result of variations in maturity stage at collection and regional varieties of fruits (Kabasakalis et al., 2000). Different techniques of measuring and squeezing process may also affect the ascorbic acid content of fruit juices (Shrestha et al. 2016). Also, it is important to note that the amount of Vitamin C in the fruits juices can be affected by the type and duration of storage. So, it becomes necessary for the fruit juices to be stored at cooler temperatures in order for its ascorbic acid contents not to decrease.

Hence, we can conclude that keeping the above factors in mind, lemon can be considered to be the best source of Vitamin C amongst the fruits studied. Also the titrimetric procedure as described above would give good results for most samples and provide an easy method for rapid determinations with simple laboratory equipment.

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A STUDY OF HUMAN DEVELOPMENT INDEX FOR SELECTED COUNTRIES

Komal Wahi, B.Sc. Economics Honours, Session: 2016-2019

[Excerpts from the Term Paper prepared for B.Sc Part III Hons Examination, 2019]

The concept of human development developed through global discussions on the linkages between economic growth and development during the second half of the Twentieth Century (UNDP Report, 2015). Human Development focuses on creating fair opportunities, choices and freedom for all individuals. Human Development, as introduced by Mahbub ul Haq, is defined as a process of enhancing people's freedom and opportunities and improving their well being. Human Development is about the real freedom; ordinary people have to decide who to be, what to do, and how to live. The HDI embodies Sen's Capability approach.

The concept of human development is founded over three pillars:

- a) To live a healthy and productive life
- b) To be knowledgeable, and
- c) To have access to resources needed for a decent standard of living.

It is found that better working environment, healthy conditions and equality among the employees has a positive effect on the productivity level.

Methodology and Data

The formula for calculating the Human Development Index (HDI) is given by:

$$\text{HDI} = 1/3(\text{Life expectancy Index}) + 1/3(\text{Education Index / Literacy Index}) + 1/3(\text{Gross National Income Per Capita Index})$$

To calculate HDI, an index needs to be created for each of the three dimensions. To calculate these dimensions the minimum and maximum values are chosen for each underlying indicator. Performance in each dimension is expressed as a value between 0 and 1, by applying the general formula:

$$\text{Dimension Index} = (\text{Actual value} - \text{minimum value}) / (\text{maximum value} - \text{minimum value})$$

If the actual value is equal to the minimum value, the index is reduced to 0, while if the actual value is equal to the maximum value then the index becomes equal to 1.

The **LIFE EXPECTANCY INDEX (LEI)** measures the relevant achievements of a country in life expectancy at birth. In this case UNDP (United Nations Development Program) considers the country's current life expectancy at birth.

The **EDUCATION INDEX (EI)** measures a country's relative achievements in terms of both adult literacy and combined primary, secondary and tertiary gross enrollment ratios. These are calculated and then are combined to create the education index with 2/3rd weights given to adult literacy rate and 1/3rd weights to combined enrollment ratio.

$$\text{Education Index} = 2/3(\text{Adult Literacy index}) + 1/3(\text{Gross Enrolment Index})$$

The construction of **INCOME INDEX (GROSS NATIONAL INCOME PER CAPITA)** is a little more complex. The income index measures the standard of living. It is measured by taking into account the real per capita income at PPP (purchasing power parity). The gross national income (GNI) per capita is the dollar value of a country's final income in a year divided by its population. A country's GNI per capita tends to be closely linked with other indicators that measure the social, economic, and environment well being of the country and its people.

$$\text{Income Index} = \frac{\ln(\text{GNIpc}) - \ln(100)}{\ln(40000) - \ln(100)}$$

Income index is 1 when GNI per capita is \$40,000 and 0 when GNI per capita is \$100

Once dimension indices have been calculated, determining the HDI is the simple average of the three Dimension Indices with equal or 1/3rd weight attached to each:

$$\text{HDI} = 1/3(\text{Life expectancy Index}) + 1/3(\text{Education Index /Literacy Index}) + 1/3(\text{Gross National Income Per Capita Index})$$

HDI has been classified into 4 categories:

- 1) **LOW HUMAN DEVELOPMENT** – It includes countries like Central African Republic, Pakistan and so on, whose HDI ranges between 0 and 0.550.
- 2) **MEDIUM HUMAN DEVELOPMENT**- It includes countries like India, Egypt etc whose indices lie between 0.551-0.699.
- 3) **HIGH HUMAN DEVELOPMENT**- It includes countries like China and Sri Lanka and HDI in this case ranges between 0.700-0.799.
- 4) **VERY HIGH DEVELOPMENT** – It includes countries like Norway and Japan and many more the value of whose indices lie between 0.800-1.0.

This above measure is given by the UNDP. The required data for HDI are taken from the reports published by UNDP in the time span 1990 to 2017.

This study compares the Human Development Index of 12 selected countries and also analyses the corruption in the 12 countries selected for study by using **Corruption Perception Index (CPI)**, which is taken from Transparency International. CPI measures the corruption levels in a nation. Countries with a score of 0-40 are referred to as highly corrupt while countries with a score of 80 and above are referred to as very clean.

ANALYSIS OF HDI OF SELECTED COUNTRIES

Human Development has been classified into four categories of low, medium, high and very high based on the values of the indices as has been discussed in section 2. Therefore, three countries have been selected from each of the four categories.

Trend Pattern of HDI: An Analysis of the 12 Countries

➤ VERY HIGH HDI CATEGORY

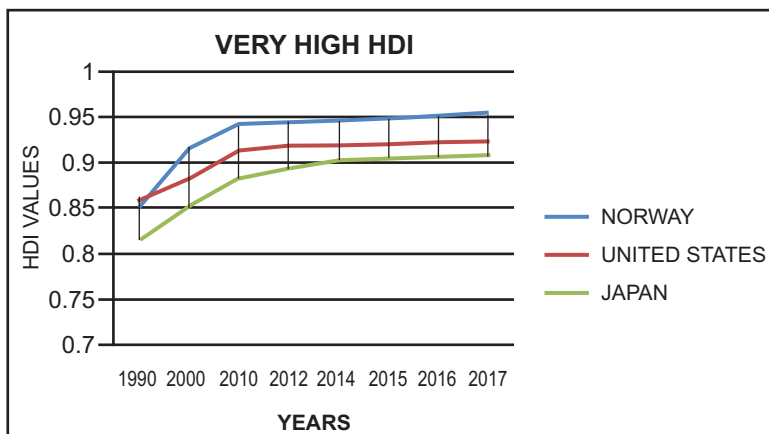
In the Very High HDI category, following countries have been selected:

Norway is currently ranked as the top country in terms of human development. Norway has been securing the top position every year since 2001 except for the years 2007 and 2008. Norway is known for its high standard of living. Norway has a very low unemployment rate which makes it a highly productive country. The poverty rates are extremely low while the wage rates are extremely high in Norway. The gap between poor and rich is significantly small when compared with other countries. Thus with more wealth and less population, Norway maintains a high standard of living.

United States is described as a developed country due to its fast growth in the indices of health and education. United States secured 13th position in terms of HDI ranking among the 189 countries. It is clearly evident from the Human Development Reports that the HDI values have been increasing for the United States since the 1990s.

Japan is also considered to be one of the developed nations. It maintains a very high GDP (Gross Domestic Product). It secured 19th position in terms of HDI ranking. The main reasons for Japan's developed status are high standard of living, better health facilities, and high literacy rates among both men and women. Figure 1, below gives an idea of the trend of HDI among the very high HDI countries.

Figure1. Trend Analysis for Very High HDI Countries



Source: UNDP Reports (Various Issues)

➤ **HIGH HDI CATEGORY**

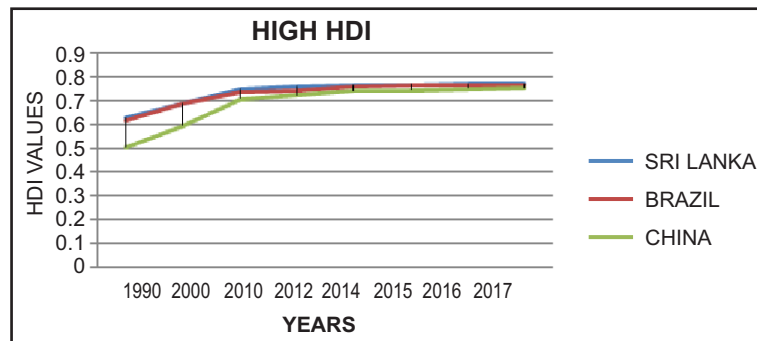
In this category also three countries have been considered.

Sri Lanka is ranked 76th in terms of HDI. Sri Lanka's population is only 20 million and it is one of those countries which has an ageing population. Sri Lanka has been consistently maintaining this rank over the last decade. However, Sri Lanka has a relatively small GDP per capita. Nevertheless, Sri Lanka has been working on improvement of all of its indices.

Brazil is still considered to be a developing country due to its low GDP per capita, low standard of living. As per the UNDP report, Brazil ranked 79th out of 189 countries.

China ranked 86th out of 189 countries. China has become a country with high levels of human development, making it the only country since 1990 to emerge from a low development to high development level (China National Human Development Report, 2016). China's notable achievements include significant improvement in per capita GDP and life expectancy. Between 1980 and 2010, China ranked 1st in terms of income index. The contribution of economic growth to its HDI was 56.26%. The figure below shows the HDI trend of the selected countries in the High HDI category.

Figure 2. Trend Analysis for High HDI Countries



Source: UNDP Reports (Various Issues)

➤ **MEDIUM HDI CATEGORY**

In this category countries with HDI values in between 0.550- 0.699 have been considered. In this case also three countries have been considered.

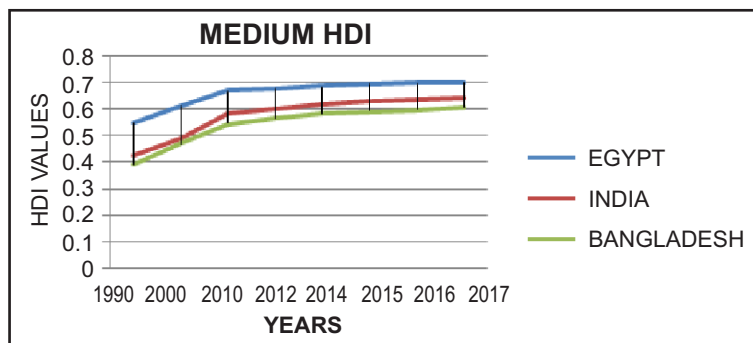
Egypt is a low middle income country. It is one of the emerging developing economies. Egypt is characterized by growing population, low standards of living and low per capita GDP. In 1990 its HDI value was 0.546. Its HDI increased to 0.611 in 2000. After 2000, its HDI has increased at a very slow pace.

India's HDI value in 2017 was 0.640, which put India in the medium human development category. According to UNDP, between 1990 to 2017 India's HDI increased from 0.427 to 0.640.

During the same period, India's life expectancy at birth also increased by nearly 11 years. Country's Gross National Income (GNI) per capita also increased by 26.6 percent between 1990 and 2017. The main reasons accounting for India's low HDI values includes the presence of caste system in India, infrastructural backwardness and an ever increasing population

Bangladesh has been recognised as a developing country by the United Nations and it falls in the medium HDI category. Bangladesh has seen a considerable increase in the HDI value since 1990. The value has almost doubled over a decade, from 0.387 in 1990 to 0.608 in 2017. The following figure explains the trend pattern of the selected medium HDI countries

Figure 3. Trend Analysis for Medium HDI Countries



Source: UNDP Reports (Various Issues)

➤ **LOW HDI CATEGORY**

In this category also three countries have been considered.

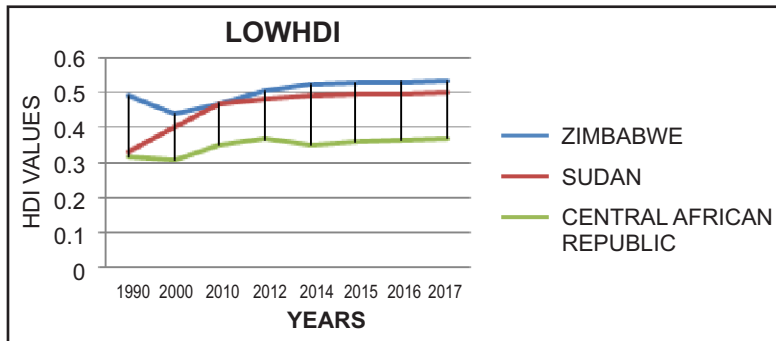
Zimbabwe is the second most developed country in Africa. It is grouped under the category of low HDI as its HDI value is 0.535 according to the HDI report 2017. It was after 2012 that the development of Zimbabwe jumped from 0.4 to 0.5 indicating an increase in the overall performance of the nation. But the existing HDI values being very low, the value are not at all satisfactory and hence the nation has to work on its weaker areas such as its rising population and low literacy rates.

Sudan ranks 167th among 189 countries. In 1990 Sudan's HDI value was 0.331 but by 2000 its HDI value rose to 0.402. After 2000 it showed a gradual increase in the HDI value. Initiatives are being taken by the Sudan government to improve on areas such as employment, population, literacy and income distributions.

Central African Republic is also categorized under the low HDI group. It is the second last nation in the entire world. Hence, it very evident by its position that it lags behind in terms of all the indices. It faces various problems such as huge populaton, rising illiteracy rate, inferior methods of production etc. Thus, the government has to take several measures to help Central African Republic come out of its status.

The following figure explains the trend among low HDI nations.

Figure 4. Trend Analysis for Low HDI Countries



Source: UNDP Reports (Various Issues)

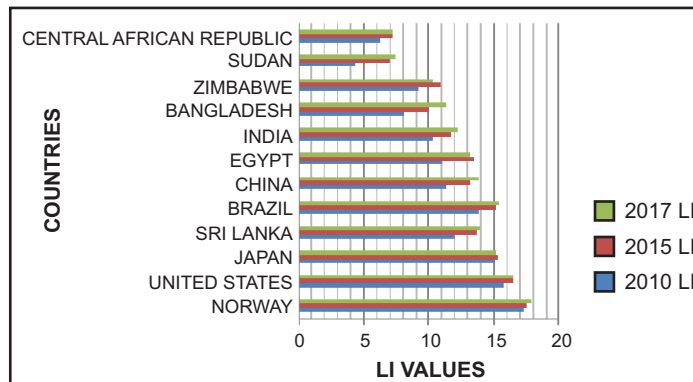
Component wise Analysis of HDI

In this section the trend pattern of the three components of HDI have been studied in the years 2010, 2015 and 2017.

- **Literacy Index**

Education being one of the important components of development, literacy index has been compared across the 12 selected countries for the years 2010, 2015 and 2017. This has been represented in figure 5.

Figure 5. Comparison of Literacy Index



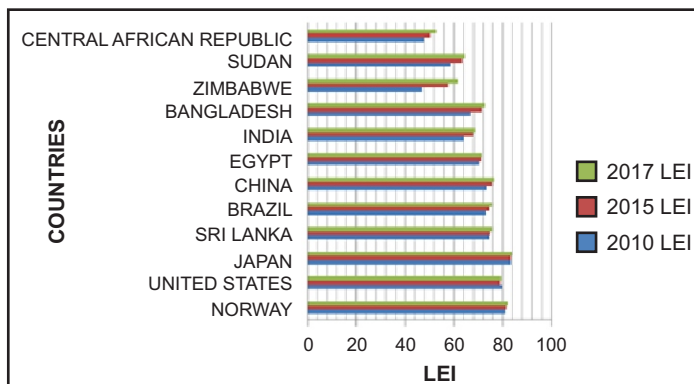
Source: UNDP Reports (Various Issues)

It is observed that Norway takes the 1st position in terms of HDI ranking while Central African Republic fares the worst among the selected nations. It is observed that from 2015 onwards all the countries have an increasing trend in terms of the Literacy Index (LI) which suggests that every country be it Sudan or Japan has been improving in terms literacy rate. The difference lies in terms of their growth rates. Japan's literacy growth is much higher than Sudan's growth in terms of literacy. Only for Egypt and Zimbabwe the LI for 2015 was more than LI for 2017.

- **Life Expectancy Index**

Life expectancy index (LEI) measures the average number of years an individual is expected to live. The trend pattern of LEI is compared for the 12 selected countries for the years 2010, 2015 and 2017. This is represented in figure 6.

Figure 6. Life Expectancy Index



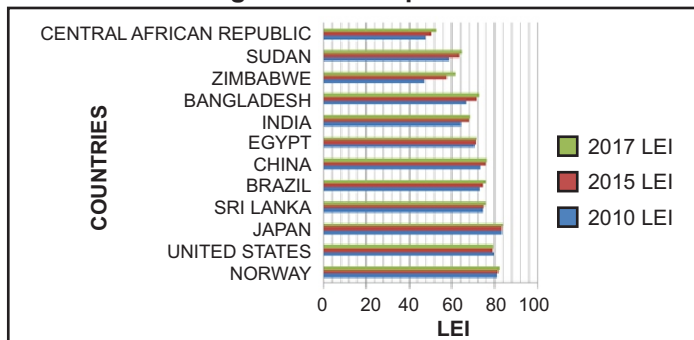
Source: UNDP Reports (Various Issues)

The analysis shows that life expectancy increased gradually for almost all the considered nations. The percentage increase was found to be least in case of Norway and Japan, while countries like Zimbabwe showed a significant increase in its life expectancy. This is so because countries like Norway and Japan already had high life expectancies, so the increase was marginal. However, it can be concluded that countries like Zimbabwe which fall in the low HDI group are also working to improve its life expectancy. It is introducing several policies and programmes to help the nation grow in terms of life expectancy.

- **Per Capita Gross National Income Index**

Per capita Gross National Income (GNI) is an important indicator of both economic growth and economic development. It is also the third component of the HDI. In figure 7, the per capita GNI is compared for the selected countries for the years 2010, 2015 and 2017.

Figure 7. Per capita GNI



Source: UNDP Reports (Various Issues)

It is very evident from the above diagram that Norway earns a very high per capita GNI every year while countries like Central African Republic, Zimbabwe and Sudan are economically backward countries earning really low per capita GNI every year. We notice that since 2010 every country has used several measures to increase per capita GNI and has been successful in it but the position of countries like Egypt and Brazil in terms of GNI deteriorated in 2017 compared to the 2015. It is very clear from the figure that countries like Japan, United States and Norway have shown a significant increase in per capita GNI over time.

Comparing Corruption and HDI

The Corruption Perceptions Index (CPI) scores countries on how corrupt their governments are believed to be. A country's score can range from 0 to 100, with 0 indicating high levels of corruption and 100 indicating low levels of corruption. Scores ranging from 60 to 100 are referred to as less corrupt while scores ranging below 40 are referred to as more corrupt.

The table below shows the corruption perception index for the year 2017 as well as comparing it with their respective HDI values:

TABLE-1: HDI AND CPI VALUES FOR THE YEAR 2017

COUNTRIES	CPI	HDI
NORWAY	85	0.953
US	75	0.924
JAPAN	73	0.909
SRI LANKA	38	0.77
BRAZIL	37	0.759
CHINA	41	0.752
EYGPT	32	0.696
INDIA	40	0.64
BANGLADESH	28	0.608
ZIMBABWE	22	0.535
SUDAN	16	0.502
CENTRAL AFRICAN REPUBLIC	23	0.367

Source: UNDP Reports (Various Issues)

The above table gives us a clear idea that the countries with high HDI values are economically more developed. The above table shows that these nations have relatively low level of corruption. While, countries like Sudan, Zimbabwe and Bangladesh which really have low HDI values are prone to high level of corruption in their respective nations.

This paper therefore studies if there exists any association between the HDI values and the CPI values because an overall development should not only consist of high level of literacy, life expectancy or growing per capita GDP but the condition or the state of the nation also plays an important role in helping the nation to grow. Corruption is the misuse of public power for private gain. Corruption is an improbity or decay in the decision-making process which has an adverse effect in the economy. Hence, highly developed countries like Norway, US and China devote their efforts in the development activities rather than corruptive practices.

The value of the correlation coefficient between CPI and HDI value for the year 2017 is 0.89 which is a highly significant (at 1% level of significance). Hence, there exists a high correlation between corruption and development of these selected countries. It means that countries with low levels of corruption comparatively develop and grow better than countries with high levels of corruption. In other words, higher the corruption level in a country lower is the human development in that country.

Hence it can be concluded that CPI plays an important role in determining the well being in an economy thus making it an important factor in contributing to a nation's development.

CONCLUSION

There's a reason why countries like Norway (2017:0.953), Switzerland (2017:0.944) and Australia(2017:0.939) secure the first 3 position. Though these countries do not top any component index, but the key lies in the fact that these countries fair considerably well in the combination of the three required indicators.

India's HDI rank (2017 – 0.640) is 130th. As described earlier the most important and crucial reasons for this medium level of human development are its unfavorable infrastructure development, rigidity in caste systems and lack of proper health and educational facilities. It is very important to correct all these loop holes so as to improve human development in India. It is now the duty of the government to step in and take all the necessary actions so as to raise India's human development and make India at par with the other developing and developed nations

On analyzing the association between the HDI value and the CPI value, it is found that the corruption levels significantly influence the rate of growth and development of a nation. High level of corruption will automatically reduce the productivity of the nation. In terms of CPI, India ranks in the high perspective index which proves that India's high level of corruption may have been playing an important role in lowering its HDI value. It is important to note that the government of India has to take necessary and immediate actions to reduce the growing corruption level so as to improve the well being of India. It is further seen that India has a very moderate level of investment under the education and health sector. Hence the government should try its best to deal with the issues related human development and the level of corruption prevailing in the nation.

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APPENDIX

TABLE A1: HDI RANKINGS AND VALUES OF 12 COUNTRIES FROM 1990 TO 2017

HDI RANK	COUNTRY	HUMAN DEVELOPMENT INDEX							
		YEARS	1990	2000	2010	2012	2014	2015	2016
		VERY HIGH HUMAN DEVELOPMENT							
1	NORWAY	0.85	0.917	0.942	0.942	0.946	0.948	0.951	0.953
13	UNITED STATES	0.86	0.885	0.914	0.918	0.918	0.92	0.922	0.924
19	JAPAN	0.816	0.855	0.885	0.895	0.903	0.905	0.907	0.909
		HIGH HUMAN DEVELOPMENT							
76	SRI LANKA	0.625	0.685	0.745	0.757	0.763	0.766	0.768	0.77
79	BRAZIL	0.611	0.684	0.727	0.918	0.752	0.757	0.758	0.759
86	CHINA	0.502	0.594	0.706	0.895	0.738	0.743	0.748	0.752

		MEDIUM HUMAN DEVELOPMENT							
115	EGYPT	0.546	0.61	0.665	0.675	0.683	0.691	0.694	0.696
130	INDIA	0.427	0.493	0.581	0.6	0.618	0.627	0.636	0.64
136	BANGLADESH	0.387	0.468	0.545	0.566	0.583	0.592	0.597	0.608
		LOW HUMAN DEVELOPMENT							
156	ZIMBABWE	0.491	0.44	0.467	0.505	0.525	0.529	0.532	0.535
167	SUDAN	0.331	0.402	0.47	0.485	0.492	0.497	0.499	0.502
188	CENTRAL AFRICAN REPUBLIC	0.317	0.309	0.351	0.365	0.349	0.357	0.362	0.367

Source: UNDP Reports (Various Issues)

TABLE A2 : DATA ON HDI COMPONENTS FOR 12 COUNTRIES FOR 2010, 2015 AND 2017

YEAR	2010			2015			2017		
COUNTRY	LEI	LI	GNI	LEI	LI	GNI	LEI	LI	GNI
NORWAY	81	17.3	58810	81.6	17.5	64992	82.3	17.9	68012
UNITED STATES	79.6	15.7	47094	79.1	16.5	52947	79.5	16.5	54941
JAPAN	83.2	15.1	34692	83.5	15.3	36927	83.9	15.2	38986
SRI LANKA	74.4	12	6498	74.9	13.7	9779	75.5	13.9	11326
BRAZIL	72.9	13.8	10607	74.5	15.2	15175	75.7	15.4	13755
CHINA	73.5	11.4	7258	75.8	13.1	12547	76.4	13.8	15270
EGYPT	70.5	11	5889	71.1	13.5	13066	71.7	13.1	10355
INDIA	64.4	10.3	3337	68	11.7	3938	68.8	12.3	6353
BANGLADESH	66.9	8.1	1587	71.6	10	3191	72.8	11.4	3677
ZIMBABWE	47	9.2	176	57.5	10.9	1615	61.7	10.3	1683
SUDAN	58.9	4.4	2051	63.5	7	3809	64.7	7.4	4119
CENTRAL AFRICAN REPUBLIC	47.7	6.3	758	50.2	7.2	581	52.9	7.2	663

Source: UNDP Reports (Various Issues)

REPORT ON A SURVEY ON READING AND LEARNING EXPERIENCE OF BA/BSC 2ND YEAR STUDENTS OF SHRI SHIKSHAYATAN COLLEGE, 2019-2020

Introduction:

Reading is an essential prerequisite to learning, as is writing. Both are an inevitable part of a student's life. However, globally there has been a gradual decrease in these activities with the inevitable rise of digitization and the popularity of online learning. In this context it is worthwhile to see how students of our college feel about and experience reading and other aspects of learning behaviour. Hence, as a summer project, IIIndyr (Semester 4) students of the Education department of Shri Shikshayatan College carried out an online survey on IIIndyr (Semester 4) BA/BSc students of the college on their reading and learning experience. The following is a report on the same.

Objectives of the survey:

1. To determine –
 - the duration spent by the students on reading for enjoyment
 - their attitude towards reading for enjoyment
 - their preferred reading
 - their writing preferences
 - their learning style and experiences
 - their self-rating on learning behaviour
2. To make a comparative study of the above between the BA and BSc students

Tool: A questionnaire on reading and learning experience was prepared by the IIIndyr (Semester 4) students of the Education Department after extensive consultation with the faculty of the department. This questionnaire was used to carry out the survey.

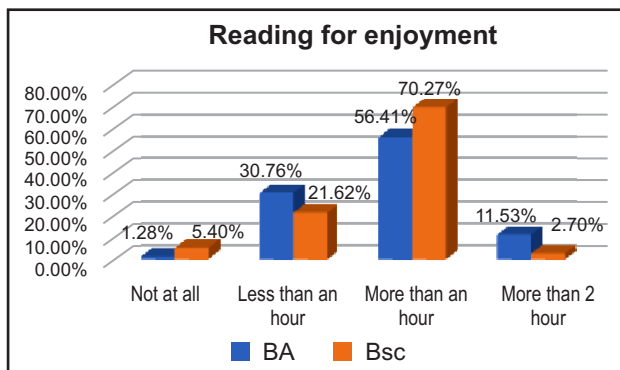
Procedure: A list of BA/BSc IIIndyr (Semester 4) students and their email id's was prepared with the help of the faculty and Class Representatives of various departments. The questionnaire to be used was then uploaded in an online survey site – SurveyMonkey – by some students of the Education dept. who then mailed it through the site to the target group. After the responses were obtained, again through the site, the tabulation was done and results analysed.

Sample :

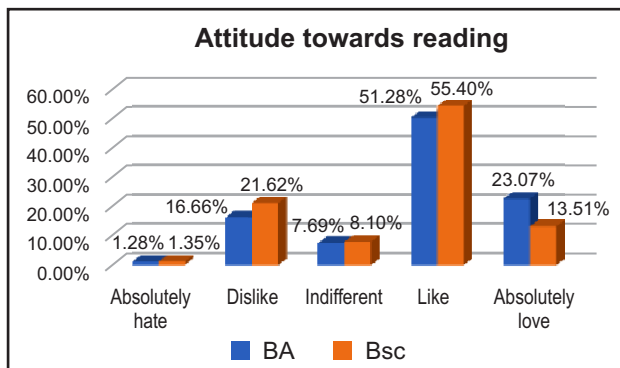
BA	Bsc
English = 33	Geography = 40
Education = 3	Economics = 27
6History = 9	Botany = 7
TOTAL = 78	TOTAL = 74

Findings of the survey:

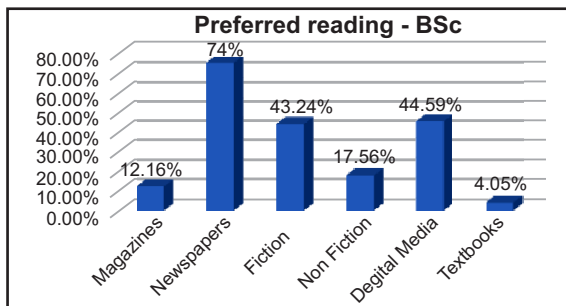
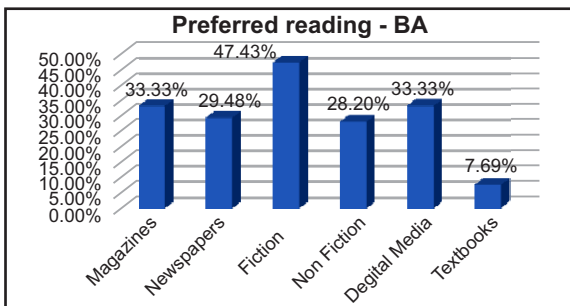
Only 11.53% of BA students read for enjoyment more than 2 hours whereas the figure for BSc students was 2.70% for the same. 70.27% of BSc students reported reading for enjoyment more than an hour, and the corresponding figure for BA students was 56.41%. 1.28% of BA students and 5.40% of BSc students reported that they did not read for enjoyment at all.



23.07% of BA students and 13.51% of BSc students said that they absolutely love reading, whereas 1.28% of BA and 1.35% of BSc students said that they absolutely hate reading.

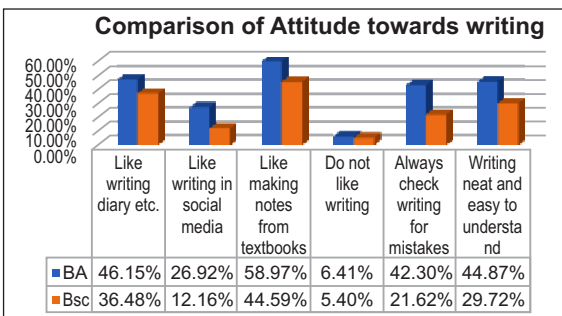
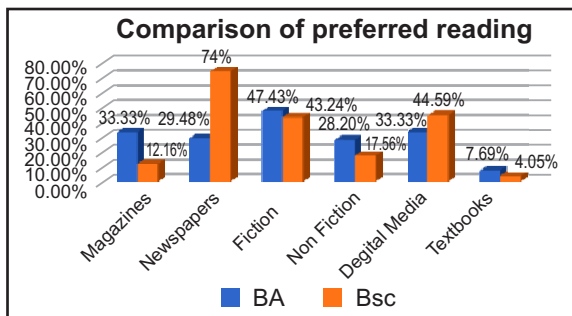


47.43% of BA students chose fiction as their most preferred reading and 33.33% chose textbooks as their least preferred reading.

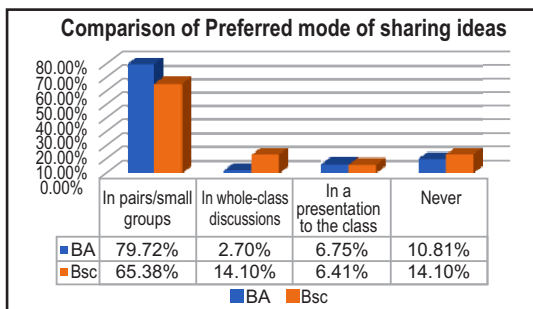


Newspapers were the preferred choice of reading for 74% of the BSc students and textbooks were the least preferred choice for 4.05% of the students.

A comparison of their preferred reading showed that 33.33% of BA and 12.16% of BSc students opted for magazines, 29.48% of BA and 74% of BSc students were inclined towards newspapers, 47.43% of BA and 43.24% of BSc students liked fiction most, whereas non-fiction was preferred by 28.20% of BA and 17.56% of BSc students. 44.59% of BSc students opted for digital media as their preferred reading as compared to 33.33% of BA students, and more BSc students – 7.69% - liked reading textbooks as compared to 4.05% of BA students.

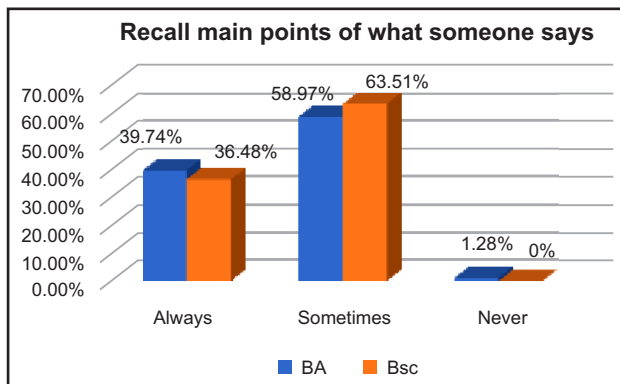


A comparison of attitude towards writing revealed that 58.97% of BA students like making notes from textbooks as compared to 44.59% of BSc students; 26.92% of BA students like writing in social media as compared to 12.16% of BSc students, 46.15% of BA students like writing diaries etc whereas 36.48% of BSc students like the same. 42.30% of BA students always check their writing for mistakes as compared to 21.62% of BSc students; 44.87% of BA students said that their writing is neat whereas only 29.72% of BSc students said the same; and 6.41% of BA students reported that they do not like writing at all as compared to 5.40% of BSc students.



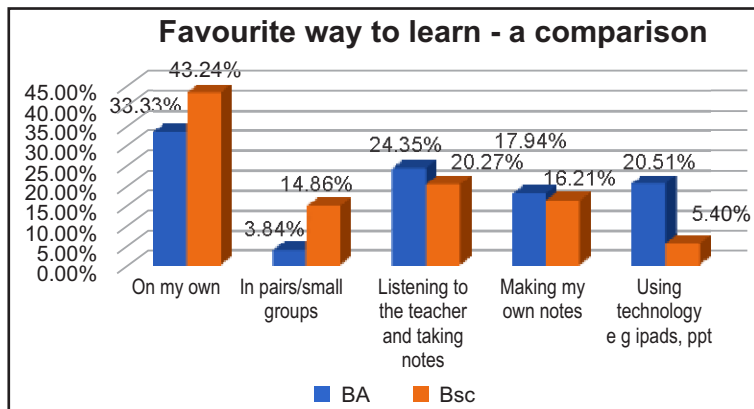
With regard to preferred mode of sharing ideas, 65.38% of BSc students opted for pairs or small groups as compared to 79.72% of BA students. Whole-class discussion was the preferred mode of 14.10% of BSc students and only 2.70% of BA students. Both groups showed almost similar preference for presentation to the class – 6.75% of BA and 6.41% of BSc students, and 10.81% of BA and 14.10% of BSc students said that they never like sharing ideas.

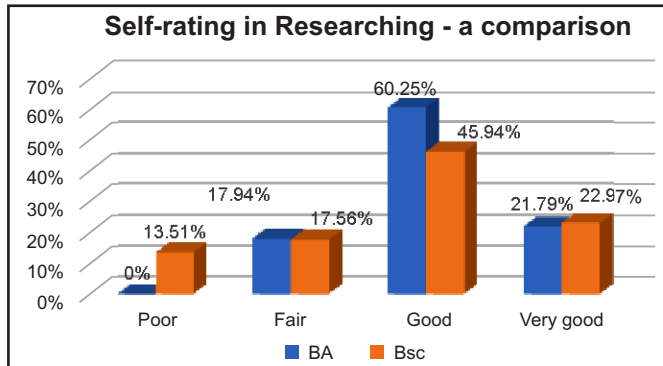
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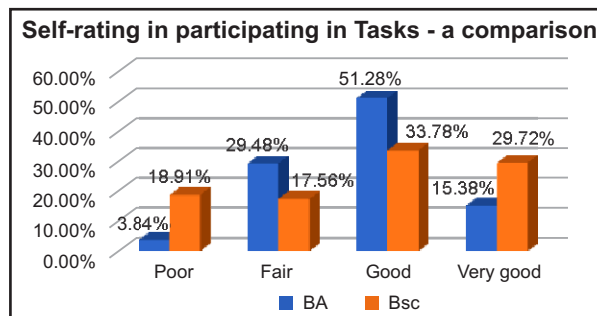
As for recalling the main points of what someone says, 39.74% of BA and 36.48% of BSc students said that they always do, 58.97% of BA and 63.51% of BSc students reported that they do sometimes. Only 1.28% of BA students said that they never recall the main points of what someone says.

The next finding was with regard to favourite way to learn. 43.24% of BSc and 33.33% of BA students said that their favourite way to learn was on their own. Listening to the teacher and taking notes was the choice of 24.35% of BA and 20.27% of BSc students. Learning in pairs or small groups found favour with only 3.84% of BA students as compared to 14.86% of BSc students; making own notes was opted for by 17.94% of BA and 16.21% of BSc students, and using technology was popular with 20.51% of BA students as compared to only 5.40% of BSc students.

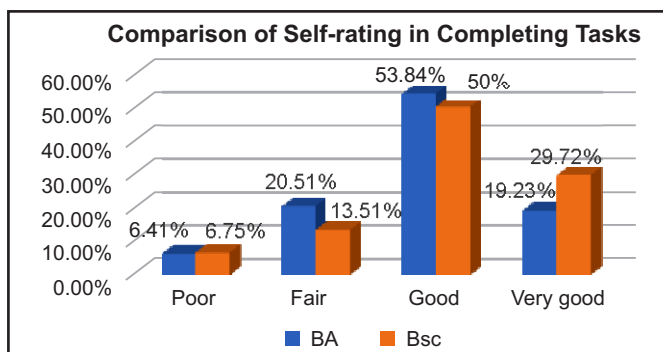




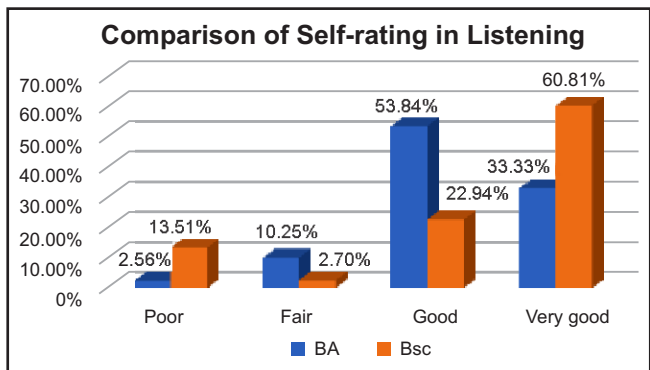
The next part of the questionnaire dealt with self-rating of the students on various aspects of learning behaviour. On the aspect of researching, 60.25% of BA and 45.94% of BSc students rated themselves as good, and as very good by 21.79% of BA and 22.97% of BSc students. Almost similar numbers opted for fair – 17.94% BA and 17.56% BSc - and only 13.51% of BSc students rated themselves as poor in researching.



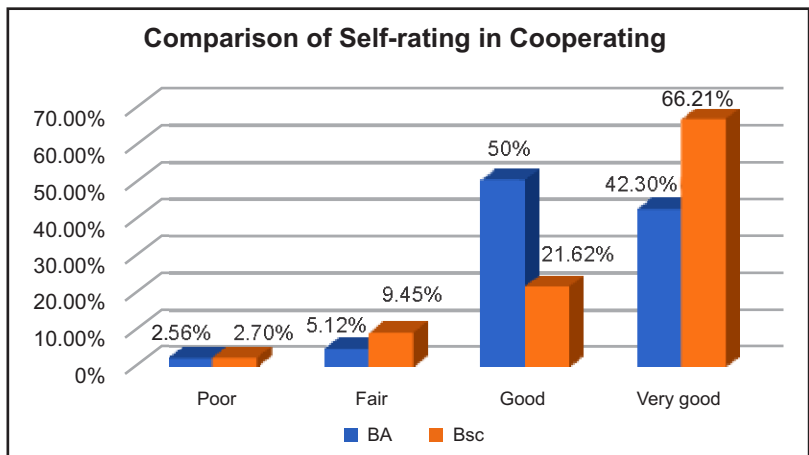
51.28% of BA and 33.78% of BSc students rated themselves as good in participating in tasks, and very good by 15.38% of BA students as compared to 29.72% of BSc students. 29.48% of BA and 17.56% of BSc students felt that they were fair in this aspect, and 18.91% of BSc students rated themselves as poor in participating in tasks as compared to 3.84% of BA students.



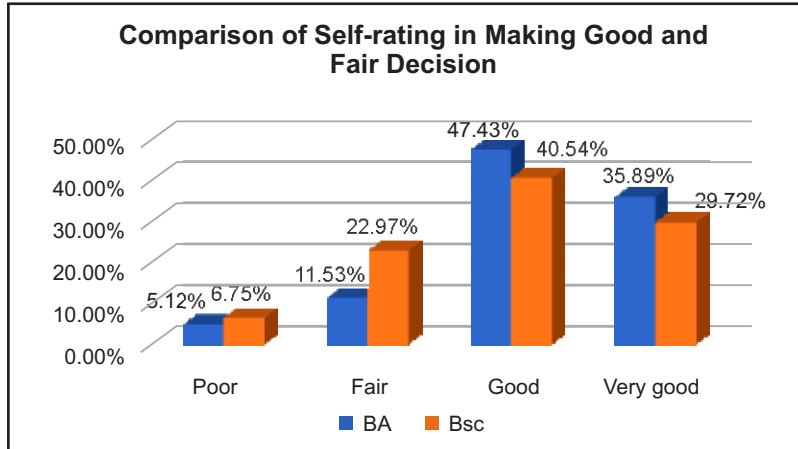
Almost half of both sample groups rated themselves as good in completing tasks – 53.84% BA and 50% BSc – and as very good by 29.72% of BSc students in comparison with 19.23% of BA students. 20.51% of BA and 13.51% of BSc students felt that they were fair in completing tasks, and almost similar numbers from both groups – 6.41% BA and 6.75% BSc – rated themselves as poor in this.



With regard to listening, 60.81% of BSc students felt that they were very good at it as compared to 33.33% of BA students. Only 22.97% of BSc students felt that they were good at listening as compared to 53.84% of BA students; 10.25% of BA and only 2.70% of BSc students rated themselves as fair in this and 2.56% of BA students felt that they were poor at listening as compared to 13.51% of BSc students.



In the aspect of cooperating, 66.21% of BSc students rated themselves as very good as compared to 42.30% of BA students; half the sample group of BA students felt that they were good at it in comparison with 21.62% of BSc students, 9.45% of BSc and 5.12% of BA students rated themselves as fair in cooperating, and only 2.56% of BA and 2.70% of BSc students felt that they were poor at it.



As far as making good and fair decisions was concerned, 47.43% of BA students rated themselves as good as compared to 40.54% of BSc students; 35.89% of BA and 29.72% of BSc students felt that they were very good at it; 29.97% of BSc and 11.53% of BA students rated themselves as fair at it, and only 5.12% and 6.75% of BSc students reported that they were poor at it.

Conclusion: Both groups did not vary too much in their reading and learning experiences, though some differences were observed in their preferred reading and writing as well as their learning behaviour.

Limitations of the survey: The sample for the study was not large. The difficulty was not only in procuring lists of students and their email id's but also in not getting a response from quite a number of students who were contacted despite repeated reminders. Since the entire survey exercise was done online it proved to be quite challenging and hence the scope of the study was limited. Also, no statistical analysis of the comparisons between the BA and BSc students were done.

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ETHNOGRAPHY AND TYPECASTING IN FOUR OF KATHERINE MANSFIELD'S BAVARIAN STORIES

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In 1909 Katherine Mansfield was sent to Bad Wörishofen in Bavaria by her mother, who hoped to “cure” her of what she perceived to be deviant sexual behaviour. Subjected to “nature therapy” and company that proved to be rather dull, Mansfield engaged in intense writing activity during her stay. The four stories analysed in this article, “Germans at Meat”, “The Child-Who-Was-Tired”, “The Modern Soul” and “Frau Brechenmacher Attends a Wedding”, were first published in *The New Age*, a reputed British socialist magazine, after she returned to England. The stories were later included in the collection, *In a German Pension* (1911), which comprises thirteen stories, all set in Germany.

A common feature of these four stories is Katherine Mansfield's representation, bordering on stereotyping, of Germans – in particular, their patriarchal, parochial and provincial attitudes, as reflected in their treatment of women and in their dietary habits. At the same time, these stories reveal Mansfield's politically engaged role in the development of early British modernism and her keen eye for noticing curious details even in the seemingly mundane. They serve “dual political and cultural purposes” and carry the unmistakable “strain of individualist feminism and British modernism” (Greber226). The narrator of these stories is a young English woman who describes, in precise but rather sardonic terms, the perceived conservatism and eccentricities of the Germans she came across during her short stay at the Villa Pension Muller.

As Ali Smith notes, “A brief glance at literary modernism and its aftermath reveals just some of the force of both [Mansfield's] presence and her importance” (vii). She is of the view that Mansfield's stories “are the opposite of inadvertent” (vii). They straddle “the opposite literary modes of decadence and modernism, symbolism and realism, readable as both high aestheticism and utilitarian politics at once”(viii). According to Smith, “Phrases, rhythms and tones in her work anticipate writers as different as T. S. Eliot and F. Scott Fitzgerald”(vii). Moreover, her fictions, unquestionably, impacted Simone de Beauvoir, Willa Cather, Christopher Isherwood and several other mid-twentieth century writers. Mansfield had a close friendship with D. H. Lawrence and his wife Frieda, on the one hand, and Virginia Woolf, who belonged to his opposite literary camp, on the other. Ali Smith says, “She unknowingly presented her friend D. H. Lawrence with one of the more sapphic narrative episodes of *The Rainbow* by telling him stories of her youth, and was later, again inadvertently, his model for the character of Gudrun in *Women in Love*”(vii). A week after Mansfield's death, Virginia Woolf writes in her diary: “It is strange to trace the progress of one's feelings...A shock of relief? – a rival the less?...the only writing I have been jealous of” (Woolf, 16 January 1923).

Katherine Mansfield was born Kathleen Mansfield Beauchamp in Wellington, New Zealand in 1888 into a socially prominent family. Her father, Harold Beauchamp, was a merchant banker. Kass, as Kathleen was known in her childhood, was the third child. She grew up in the small village of Karori, just outside Wellington. As a child, she wore spectacles and had a stammer, and her mother thought her overweight. Nevertheless, these were the happiest years of her childhood. She was the outlaw in her otherwise conventional family. Her father sent Kass, along with her elder sisters, to London to study at Queen's College, a liberal girls' school. At Queen's College she met Ida Baker who became her life-long friend and companion. Ida was entirely supportive and devoted to Kathleen and Kathleen could display herself in all the variety of her moods being confident of Ida's acceptance. It was during her stay in England that Kathleen Beauchamp adopted the name Katherine Mansfield (Carter 204-7).

Katherine Mansfield's stories, as well as her poems, were generally about emotional experiences. Early in her literary career, she was influenced by the French Symbolists and Oscar Wilde and most significantly Anton Chekhov. "Like Chekhov, indeed, she had an eye for the subtleties, rather than the dramatics, of human behaviour, although she had not yet cultivated that power of compassionate irony which tempers a too ardent sensibility," writes W.E. Williams. "She responded deeply to what G. K. Chesterton called the 'tremendous trifles' of life, and could discern in a trivial event or an insignificant person some moving revelation of motive or destiny" (Williams 7).

Mansfield once wrote, "Without emotion, writing is dead; it becomes a record instead of a revelation, for the sense of revelation comes from that emotional reaction which the artist felt and was impelled to communicate" ("Esther Waters Revisited" 68). Like her more famous later works, the four stories dealt with in this article reveal her fascination with human psychology, and the "unconscious as well as the conscious determinants of human behaviour" (Hankin x).

Katherine Mansfield wrote several short stories during her stay in Bad Worishofen, a spa town in Bavaria in 1909, where she was sent by her mother after her pregnancy (which was to end in a tragic miscarriage) and her failed marriage. The characters and context of these stories, we find, are set in the cultural and political milieu of pre-World War I Europe. Mansfield considered this collection as "juvenilia" and refused permission to reprint it in 1920. She believed that her portrayal of the Germans ran the risk of contributing to the prevalent jingoism in post-war England. Incidentally, the collection was reprinted in 1926, after her death, by her husband John Middleton Murry. Even though Mansfield was not proud of this collection which she had written in her formative years as a literary artist, these stories contain acutely observed portrayals of German stereotypes, their oddities and angularities, their pretentiousness and their repression of women.

In the first story in this volume, "Germans at Meat", Mansfield expresses her disgust at the German obsession with food through sarcasm, and she reacts sardonically to their arrogance and penchant for being judgmental towards the English. The English narrator (Mansfield herself) observes the owner and the guests at the boarding house, Villa Pension Muller, where she was staying at the time. The narrator is the only English guest there, and Herr Rat, one of the principal

characters in the story, seems to be proud of his nationality and bent upon declaring the Germans to be racially superior to the English. He is obsessed with his food and health, though the large quantity he consumes appears to contradict and belie this concern. He had “cold blue eyes,” would “eat sauerkraut with great pleasure,” and was heard to proclaim, “I have had all I wanted from women without marriage” (*Collected Stories* 683-4). Fraulein Stiegelauer, the owner of the Pension, does not seem to care much for table manners or courteousness. Like many another German woman Mansfield had come across, Stiegelauer had nine children. The German lady, in her turn, shows her contempt for the narrator, when the narrator declares that she is a vegetarian and had not eaten meat for three years, saying:

There now, you see, that’s what you’re coming to! Who ever heard of having children upon vegetables? It is not possible. But you never have large families in England now; suppose you are too busy with your suffragetteing (*Collected Stories* 684-5).

Katherine Mansfield is at no point trying to disguise her distaste for the physically dominant men and their unabashed appetite conveyed through the symbolism of food. The dinner table conversation between the German guests of Stiegelauer and the young English narrator is also indicative of the author’s resentment against her father, Harold Beauchamp, as portrayed through Herr Rat. Even as early as 1906, while sailing back to New Zealand, Mansfield wrote in a letter:

My Father spoke of my returning as damned rot, said look here, he wouldn’t have me fooling around in dark corners with fellows. His hands, covered with long sandy hair, are absolutely evil hands. A physically revolted feeling seizes me. He wants me to sit near. He watches me at meals, eats in the most abjectly, blatantly vulgar manner that is describable ... He is constantly suspicious, constantly overbearingly tyrannous ... I cannot be alone or in the company of women for five minutes – he is there, eager, fearful, attempting to appear unconcerned, pulling at his long drooping red-grey moustache with his hairy hands. Ugh! (*Collected Letters* 19).

Herr Rat seems to have a distinctive taste for routine and order and plans his day and night meticulously:

This morning I [Herr Rat] took a half bath. Then this afternoon I must take a knee bath and an arm bath ... then I do my exercises for an hour and my work is over. A glass of wine and a couple of rolls with some sardines (*Collected Stories* 686).

Another guest, Herr Hoffmann, makes arrogant and dismissive remarks about England and the English when the conversation turns to the topic of the War: “We don’t want England. If we did we would have had her long ago. We really do not want you.” The narrator retorts, “We certainly don’t want Germany” (*Collected Stories* 686).

Katherine Mansfield is not kindly disposed towards the German women either. She cannot countenance their tendency to have a large family and cater to their husbands’ corporeal needs. The author’s sarcasm pours out when, in response to the boarding house owner’s utterance “How can a woman expect to keep her husband if she does not know his favourite food after three years?” the narrator says “Mahlzeit” (*Collected Stories* 687) (Enjoy your food), while closing the door after her.

Katherine Mansfield's first published story, "The Child-Who-Was-Tired", which was included in *In a German Pension*, was modelled on one of Chekhov's short stories, "Sleepy". Mansfield sets her story in Germany, continuing with her reproof of the Germans and their ways of life. The story shows a stereotypical German family with four small children, a working father and a pregnant mother. The eponymous child in the story has to perform the daily chores of the family, including minding the other children. She is exploited and abused the whole day long, which leaves her exhausted by the end of the day. The father is portrayed as rude and vulgar; he does not care about the family's needs. The Frau is demanding and unsympathetic towards the child. "Get up, you good-for-nothing brat, get up and light the oven or I'll shake every bone out of your body" (*Collected Stories* 744) is how the child is regularly woken up in the morning by the mistress. After issuing her with a series of orders, the Frau "staggered across the room, flung herself on to her bed, drawing the pink bolster round her shoulders" (*Collected Stories* 744). The child murmurs to herself, "I'm sleepy. That's why I'm not awake" (*Collected Stories* 744).

When the master strides in for his breakfast, he too grumbles at her for her sloppiness and her lazy demeanour. The child finds the manner in which he stuffs his mouth with bread and gulps down coffee shocking. She is horrified at the news that another baby is "coming." She struggles to wake the other three children up and get them ready for school, but is beaten up by the mistress, who does not spare her own children either, for she considers disciplining the kids her only maternal duty. Criticized and tortured at every step and in every way and tired to death, the child is unable to take it anymore. She ultimately smothers the crying baby with the pink bolster, before falling asleep. "She heaved a long sigh, then fell back on to the floor, and [started dreaming that she] was walking along a little white road with tall black trees on either side, a little road that led to nowhere, and where nobody walked at all – nobody at all" (*Collected Stories* 752).

From the story itself we learn that the child was a "free-born one – daughter of the waitress at the railway station" (*Collected Stories* 750). The mother had tried to "squeeze her head in the wash-hand jug" (*Collected Stories* 750), an action that left the child half silly. This exploited child, who tries to stop the baby from crying incessantly by smothering it, without any intention of killing it, is a victim of the economically and socially powerful employers, and the narrator seems to suggest that the blame lies not with the child but with her mother as well as her employers.

Both "Germans at Meat" and "The Child-Who-Was-Tired," along with the other stories in *In a German Pension*, focus on the manners and attitudes of the Germans whom Mansfield came across during her stay in Bavaria. C.A. Hankin writes:

A preoccupation with the physical relations between men and women is to the fore in the *In a German Pension* stories. Especially striking is the way in which a portrayal of the Germans' gross eating habits barely disguises a persistent correlation between the devouring of food and the sexual devouring, as it were, of a woman's body ... Katherine Mansfield reveals an overwhelming fear of physically dominant men and of male sexual appetite, often through the symbolism of food (63).

“The Modern Soul” is a multi-layered story concerned with the sexual desires of Herr Professor, the German music teacher, and the longings of Sonia Godowska, a young, immature, narcissistic actor. Sonia has come with her mother, Frau Godowska, to stay in the Pension, where the music teacher is also a guest. The Professor, who plays the trombone, brags about the quantity and variety of fruit he enjoys, particularly the cherries, and has an eye for Fraulein Sonia Godowska. Sonia, on her part, claims to be “furiously sapphic”, in love with her mother who, at the same time, is her “tragedy.” Sonia reveals: “If I find a simple, peaceful man who adores me and will look after mamma – a man who would be for me a pillow – for genius cannot hope to mate – I shall marry him” (*Collected Stories* 720). Sonia seems to prefer to enter into a relationship with a man where she can feel safe, free from the threat of male oppression.

The story centres around the sexist German music Professor, who explains why he is so fond of cherries, “There is nothing like cherries for producing free saliva after trombone playing, especially after Grig’s ‘IchLiebeDich’. Those sustained blasts on ‘liebe’ make my throat as dry as a railway tunnel” (*Collected Stories* 711-2). “The Modern Soul” cannot be regarded as a story merely about the battle of the sexes. The prejudice of the Germans against the English is apparent from the comments exchanged between the Professor and Sonia’s mother. The Professor finds them intellectually inferior, while according to Sonia’s mother the English are “Fish-blooded...Without soul, without heart, without grace” (*Collected Stories* 714-5). At the same time, the story is an ironic comment on the middle-aged, conceited Herr Professor Windberg’s expectations and Sonia’s neurotic fixation on her creative faculties: “Out of my great sorrows I make my little songs” (*Collected Stories* 720).

“Frau Brechenmacher Attends a Wedding” is another story in *In a German Pension* revolving round the theme of complete patriarchal dominance verging on domestic abuse. According to C.A. Hankin it is:

[A]n undisguised attack upon the sexually dominant male. In portraying the indignities and the suffering heaped upon women in marriage, Katherine Mansfield might almost be dramatizing her own expressed belief that ‘it is the hopelessly insipid doctrine that love is the only thing in the world, taught, hammered into women, from generation to generation, which hampers us so cruelly’ (64).

The story is narrated in the third person and throughout the story the Frau is shown to be at the beck and call of her bully of a husband. She is getting ready for the wedding of another woman, who had been deserted by the father of her illegitimate child, and has “the appearance of an iced cake all ready to be cut and served in neat little pieces to the bridegroom beside her” (*Collected Stories* 706). The Frau asks her daughter, Rosa, to stay with her and help her get Rosa’s father’s uniform ready. The Frau packed four of the five babies to bed and there is no disguising the fact that Rosa is, in fact, being trained to serve her father. Once at the wedding, the Brechenmachers find the ladies gossiping about the fact that the groom is not the father of the bride’s child. They are judging the bride by their orthodox views: “That’s what I call a sin against the Church for a free-born child to attend its own mother’s wedding” (*Collected Stories* 707).

In the meanwhile, Herr Brechenmacher is making a fool of himself, “drinking far too much ... gesticulating wildly, the saliva spluttering out of his mouth as he talked” (*Collected Stories*709). Once again, drinking and feasting figure as the leitmotif. After dinner, as Herr Brechenmacher presents the newly-weds with a big silver coffee-pot, “Everybody laughed at his speech, except the Frau; everybody roared at his grimaces, and at the way he carried the coffee-pot to the bridal pair, as if it were a baby he was holding” (*Collected Stories*709). Inside the pot was a baby’s bottle and two little cradles holding china dolls. The bride felt affronted, while the groom dangled the toys at which “the hot room seemed to heave and sway with laughter” (*Collected Stories*709).

Frau Brechenmacher did not think it funny. She stared round at the laughing faces, and suddenly they all seemed strange to her. She wanted to go home and never come out again. She imagined that all these people were laughing at her, more people than there were in the room even – all laughing at her because they were so much stronger than she was (*Collected Stories* 709-10).

The Brechenmachers return home in silence, with the man several steps ahead and the wife stumbling behind, just as on their way to the marriage. Back home, she prepares a supper of meat and bread for her husband. Herr Brechenmacher reminisces about their first night. “You were an innocent one, you were,” he says (*Collected Stories*710). The Frau goes to bed muttering to herself, “Always the same, all over the world the same; but, God in heaven – how *stupid*” (*Collected Stories*711). The narration ends, “Then even the memory of the wedding faded quite. She lay down on the bed and put her arm across her face like a child who expected to be hurt as Herr Brechenmacher lurched in” (*Collected Stories*711).

For the woman, who is not given a name of her own but is known by her husband’s name as in most of these stories, Mansfield deliberately uses the phrases “the little Frau” and “child” to signify that in spite of being married for so long and having five children, she has never been allowed to come out of her husband’s ever dominating influence or to forge an autonomous identity.

In the four stories discussed here, as in the others in the collection *In a German Pension*, we notice recurrent references to sexual relationships, the Bavarians’ conservative notions of women as child-bearers, and Mansfield’s visceral distaste for the food habits of German men. Unusual as an entry-point into the study of Mansfield’s writing, the collection offers us a glimpse into the process of her evolution as a writer: while on the one hand, she has developed an eye for the finer details of characters, her ability to paint truly empathetic and nuanced portraits is yet to reach maturity. Her reading of the characters, intriguing as they are, limits itself to a racial or ethnic gaze, rather than seeing them as individuals. These seemingly simple stories, with the unfolding of psychological drama, unmistakably foreshadow her later, more mature writings, for instance, “Bliss” (1918), “Daughters of the Late Colonel” (1921) and “At the Bay” (1922).

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A BRIEF STUDY ON ROBERT FROST AND THE CONCEPT OF DUALISM IN HIS POEMS

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Robert Lee Frost (1874-1963), one of the foremost American poets of twentieth century. His poems stand for deep contemplative lyrics in simple words to reach as many. He was born on March 1874, in San Francisco, California, to "an ardent Democrat and states' Rights man" Sir William Prescott Frost Jr. and Isabelle Moodie, a Scottish immigrant. After his father's death eleven years old Frost along with his mother and sibling moved to the town of Lawrence in Massachusetts. There he graduated from Lawrence high school in 1892. Although known for the rural images in his poems Frost grew up in city and he published his poems in high school magazine. He was a class topper and he shared his Valedictorian honours with Elinor White. After that he joined Dartmouth College for several months, returning home to many unfulfilling job. In 1895 he marries to Elinor with whom he fell in love before. In 1897 he started attending Harvard University but had to drop out due to health concerns. Following his mother's death due to cancer in 1900, the American poet moved to New Hampshire, with his wife and children, leaving his younger sister, Jeanie, back in an asylum where she expired after twenty years. After gaining the full ownership of their poultry farm at Derry, Frost decided to make a new start in London, where publishers were more concerned with new writers. With his efforts came out the very first poetry collection *A Boy's Will* in 1913 and *North of Boston* in 1914. During World War I Frost returned home when his works became the best seller under the American Publishing House of Henry Holt. Reviews of Amy Lowell and Ezra Pound on his work further justified his works to the readers. Frost was a part-time lecturer at Amherst College and at the University of Michigan from 1916 to 1938. *Mountain Interval* (1916) gained him a higher level of establishment and reputation. His reputation further enhanced by *New Hampshire* (1923) due to which he received Pulitzer Prize for poetry, which was also awarded for his collections like, *A Further Range* (1936), *Steeple Bush* (1947), and *In the Clearing* (1962). Frost earned many awards and honours from every quarter during his old age. He served as poet-in-residence at Harvard, Dartmouth and Amherst College. On his 75th birthday, the US Senate proclaimed "His poems have helped to guide American thought and humour and wisdom, setting forth to our minds a reliable representation of ourselves and of all men". He was invited at the inauguration ceremony of President John F. Kennedy where he was asked to recite the poem "The Gift Outright" on 20th January, 1961. Frost died at the age of 88, on 29th January in 1963 due to complications from prostate surgery. He was buried in Old Bennington Cemetery in Vermont. His epitaph quotes the last line from his poem *The Lesson for Today* (1942), "I had lover's quarrel with the world."

According to biographer Lawrence Thompson, Frost, due to his personal grief, “was his feeling that if he were now able to measure the difference between illusion and reality he was also inclined to suspect that what he presently viewed as reality might soon become for him another kind of illusion – and this fear drove him to the verge of a nervous breakdown...” His wide range of wise contemplative poetry depicts the uneven boundary between human mind and nature set in the country background of New England. He is famous for his metrical form against the natural rhythm of the everyday speech. According to Frost the deep human emotion encased in his verse can only be truly felt and understood by a mature mind; imparting philosophic knowledge among his readers. This paper deals particularly with Frost’s poetry indicating his belief in “the two elements of our being” of dualism –taking examples from his poems, “Stars”, “After Apple Picking” and “Cluster of Poems” which belongs to three different collections of his poetry, such as, *A Boy’s Will*, *North of Boston*, and *In the Clearing*, respectively, which shall give us a better idea about his philosophical views on mind-body dualism.

From *A Boy’s Will* the poem “Stars” with its lucid language presents the intrinsic intuitive state of mind of the poet. The poem injects a sense of ambiguity regarding the connection between nature and human as it reveals how ‘Tumultuous snow’, snow-covered tall ‘trees’, ‘wintry wind’ together with the ‘white rest’, ‘a place of rest’, ‘invisible at dawn’, are being observed “...With neither love nor hate” by “snow-white marble eyes”. The metaphor devised by Frost radiates the concept of unity and separation that binds everything that ever exists. Here “White” stands as a powerful symbol to depict the natural setting as well as the ‘palsy-stricken’ human race on the contrary.

The colour ‘White’ denotes peace, religion, harmony, snow, light, visibility and lots of other positive implications but also ‘white’ indicates blindness, colourless, coldness, dry, death, invisibility, end and other negatives; thus showing the readers the uncertain facade of the life and death or even more prominently truth. In addition the purposeful use of the ‘winter scene’ is clearly to accentuate further the dark, uncaring, hostile ‘cold’, ‘snow-white’ eyes of the world. According to Reuben Brower, “Opposites meet in Frost’s vision ... not however in a unity in which evil is transformed into good, but in a ‘melancholy dualism’ that sees potential darkness in both love and hate.”

In another poem, “After Apple Picking” from the second collection *North of Boston*, he conveys insightful philosophy through simple words. The poem begins with some aesthetic metaphors.

“My long two-pointed ladder’s sticking through a tree
Toward heaven still,
And there’s a barrel that I didn’t fill
Beside it, and there may be two or three
Apples I didn’t pick upon some bough.
But I am done with apple-picking now.”

Where the poet’s concern shifts from ‘apple picking’ to the unfilled ‘barrel’ and a few unpicked apples producing a sense of disappointment for not achieving ‘heavenly’ pleasure; highlighting a

sense of physical exhaustion being tired of the indolent task of apple-picking in the successive lines; which also indicates the biblical connotation of the 'fall of man' along with the Edenic (idyllic) innocence and loss of it.

This stream-of-consciousness poem offers a detailed description of 'Apple harvest' from the point of view of a hard-working farmer who 'cherishes' his every memory of 'picking', touching the 'magnified' apples. Due to the gruelling work done he tends to fall asleep; leading to some successive image of his subconscious mind.

Frost himself was not considered successful at farming inspite of ten years of 'solitude and independence' before disowning his farmlands.

"Fill your cellar and fill your larder,"
Frost once advised,
"so that you can go into the siege of winter with zest.
Go to the cellar stairs; look at the preparations for winter.
Smell the apples. Have a good cellar.
That is a part of the good life."

The generous use of poetic device of sensuousness like 'essence', 'drowsing', 'scent', 'strangeness', 'melted' adds on to ruminating mind of the poet persona indicating his engrossed dream which is present individually besides the vivid description of natural world.

"Essence of winter sleep is on the night,
The scent of apples: I am drowsing off.
I cannot rub the strangeness from my sight
I got from looking through a pane of glass
I skimmed this morning from the drinking trough
And held against the world of hoary grass.
It melted, and I let it fall and break."

The following lines express how the mind of the poet narrator or the tired farmer is drowning into his dream breaking into another world of 'magnified apples', 'stem ends' and 'blossom ends' delineating a constant ebb and flow of optimism and pessimism in it.

"But I was well
Upon my way to sleep before it fell,
And I could tell
What form my dreaming was about to take.
Magnified apples appear and disappear,
Stem end and blossom end,
And every fleck of russet showing clear.

My instep arch not only keeps the ache,
It keeps the pressure of a ladder-round.
I feel the ladder sway as the boughs bend.”

The use of the word ‘sleep’ six times including its four-times use of the word ‘sleep’ in the end lines of the poem discloses the poet’s ambiguous debate whether it is the seasonal sleep of winter or the wearing out of ‘death’ as a metaphor, or the long enough hibernating slumber of animals or lastly is it the daily, an uncertain pattern of human sleep? It keeps this deceptive question underlying the subtle suggesting tone of its surface.

Some critics believe that his later works holds clearer discussing of his philosophical believes. As Frost’s matured his works witnessed numerous critical study which further enlightened the readers regarding the inherent philosophical message he tried to convey through simple words. Cluster of Faith includes collection of poems explicitly dealing with such notions under his poetry collection *In the Clearing*. During the time of numerous discoveries and ideas relating to the Creation of the universe, Frost reflected his own perception in “Accidentally on Purpose”. Frost strongly opposed the concept that ‘mind or the spirit of man’ was a result of its biological evolution from matter as believed by the Victorian scientists. ‘Until Darwin came to earth upon a year’ with the idea of ‘Natural Selection’ further supporting Frost’s belief of the co-existence of the physical as well as the spiritual. Similarly in “A Never Naught Song” we get the perfect image of how ‘matter was begun’ from ‘atomic One’ with everything ‘one and yet discrete’ surviving ‘conflict and pair’. The mention of the Norwegian ‘whole Yggdrasil’ justifies the presence of a Creator or a God with the purpose to connects all the individual elements in the world.

Out of the all the poems from *In the Clearing*, “Version” turned out to be more specific regarding God’s ‘humour’ while creating ‘man’, an amalgam of potential tragedies as well as spirit of comedy; As Frost once said that he was never more serious than when he was joking. In “A Concept Self-Conceived”, Frost voiced against the rational oneness of God. It stands as a good example for ‘rebuttal of monism and a serious prelude to dualism and comic spirit’ that also conveys the spirit of some of the later poems of that same collection. As Frost ends *Cluster of Poetry* with “Forgive O Lord my little jokes on Thee/ And I’ll forgive Thy great big one on me”, it easily proposes and confirms the reciprocity of humour of comedy between God and Man.

“Dualism” is closely associated with the thought of René Descartes (1641), which holds that the mind is a nonphysical—and therefore, non-spatial—substance. Descartes clearly identified the mind with consciousness and self-awareness and distinguished this from the brain as the seat of intelligence. Hence, he was the first to formulate the mind-body problem in the form in which it exists today. Dualism is contrasted with various kinds of monism. Mind-body dualism is the view in the philosophy of mind that mental phenomena are non-physical, or that the mind and body are distinct and separable. Frost’s ideas on dualism involves with the creative human mind.

Frost as 'an awakener not a teacher' imparted philosophical knowledge through all his works in which his central subject has always been man whom he portrays on the background of a diverse universe either acting indifferent or antagonistic towards the same subject. In spite of being deeply moved by the transcendentalism Frost never really resolves his 'convictions and conclusions', thus leaving a permanent mark of obscurity in most of his poems.

As his close friend Peter J Stanlis wrote "To Frost, the dualism of spirit and matter, of the two sexes, and of good and evil, was built right into the evolutionary process. What he called "the challenge... between man's originality and his law and order," which determined both historical changes and the course of evolution in man, is rooted in the creative power in the mind or spirit of man as a species, as part of his dualistic nature." (In the Clearing: Continuity and Unity in Frost's Dualism)

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THE STRUGGLE OF WOMEN THROUGH AGES : FROM THE LITERATURE POINT OF VIEW

Shilpa Mondal, M.A. English

Abstract:

Women have always been at the forefront of struggle worldwide. The status and position of women were never the same in all ages. This article is a quest to identify the role of women in literature and their transformation that have evolved through these passing eras. The tale of women's lives has been portrayed differently in different eras of literature. It speaks of the status of women in past and present. In this paper, two worlds have been mentioned –real world and the world of literature. This is to identify whether the portrayal of women in literature is same as the real life of women in the contemporary society. It also highlights upon the need of women empowerment and gender equality as women confront somewhat lower strata than that of men in all sectors. The study shows the various ways through which women empowerment and gender equality have been achieved to some extent. However, it will be completely achieved until women come forward and empower their own selves.

Keywords: women, struggle, women empowerment, gender equality, literature, novels, economic independence, society.

Introduction:

Women has evolved through ages and centuries, right from the old Anglo-saxon period to till date in the 21st century. Each period in literature portrays women differently and it acts as a mirror to the contemporary society. Hence, no doubt, literature has been the best witness through these passing years.

Life of women is full of hardships. Through many decades women have been struggling to be equal to men, both at home and in the workplace. They have always been considered as the weaker section of the society. Inequalities between men and women, and discrimination against women have also been age-old issues all over the world. It is only with women that on one side they are raised to the position of goddess and on the other, they are abused endlessly and considered as inferior. All these peculiar conditions gave impetus to the concept of what is known as 'women empowerment' today. Loud avowal of feminism is now being heard from all over the world. Literature mirrors the society and the societal values. Therefore, the reflection is purely seen in the writings of the time. Every age, every period speaks something different about women of the contemporary society. However, education was strictly limited to men in earlier times. Most of the published writers were men and so portrayal of women was no doubt biased. Hence, this research paper speaks of the status of women and their efforts made in past and present. It also draws attention on the necessity of empowerment of women.

Status of women:

The status of women is transforming from time to time. It has been an exciting history for women all over the world and specially in India. During the early Vedic times, women had similar education as men and participated with men in philosophical debates. Most scholars agree that women in ancient India held the most elevated position of all times. The *Rig Veda* says, "The wife and husband, being the equal halves of one substance, are equal in every respect; therefore, both should join and take equal parts in all works, religious and secular." The significant female figures of the Vedic period are Ghosha, Lopamudra, Sulabha Maitreyi and Gargi. They are also known as the 'bidushi mahila'. During the early Vedic period, women enjoyed equal position and rights but, they had to face some adversities during post-Vedic and epic ages. Focusing on the Indian epics, such as, the *Ramayana* and the *Mahabharata*, the women characters are portrayed as 'ideal women' who are submissive, meek, self-sacrificing and obedient. From a feminist perspective, it can be said that the epic women characters such as Sita and Draupadi had their unfair moments of subjugation due to their gender. These epics objectified women and treated them as man's property. According to historical facts, during 11th century, the position of women started to decline with the Muslim conquest in the Indian subcontinent. Hindu women were subjected to slavery and trading. The devdasi system also prevailed during this time.

The position and status of women all over the world has risen incredibly in the 20th century. We find that it had been very low in the 18th and 19th centuries in India and elsewhere, when they were treated like 'objects' that can be bought or sold. For a long time, women in India remained confined to the four walls of their household. They were completely dependent on menfolk. But there is a thorough change in the changing world where the power of women has come to be recognized gradually. They are given power to possess and exercise. There is, indeed, the empowerment of women.

Women in real world in relation to women in the world of literature:

'Women in real world in relation to women in the world of literature' – the goal of this research is to seek examples and compare the portrayal of women in literature through the writings of the different periods. This is to identify whether the portrayal of women in literature same as the real life of women in the contemporary society. From the centuries, literature is conveying and mentioning clearly about the scenarios and conditions of the world.

In the age of Chaucer, it is seen that obedience in medieval England was required by women. If a woman dare to defy male power she was seen as a wicked woman following the footsteps of Eve. If however a woman stayed true to her husband and remained obedient, no matter how severe her situation became, she could be compared to the Virgin Mary. These very opposite types of women are represented in Geoffrey Chaucer's '*The Canterbury Tales*' where most of the tales engage with gender relations and reflect the characters' perspective towards the opposite sex. However, even though women in Chaucer's time were too obedient and submissive to male authority, he creates female characters such as the character of Wife of Bath who challenges the patriarchal order.

William Shakespeare's 'Sonnet 130' is a parody of traditional love poetry. He starts his poem with: " My mistress' eyes are nothing like the sun". By this, he mocks at the kinds of exaggerated comparisons which appear in the Petrarchan sonnets where the mistresses are compared as 'eyes like the sun' and 'skin as white as snow'. Like Donne, Shakespeare also regards a woman as a woman of the real world with all her shortcomings and limitations.

It is well-known that women had less freedom than their male counterparts in Shakespeare's time. In the late 16th century the presentation of female roles were allowed on stage. But the characters of women were acted by young men and not by women themselves. All of his famous female roles like Desdemona, Juliette, Lady Macbeth were in fact once played by men. Shakespeare's plays have a wide variety of female characters who immensely vary from one another. Some are dominant, some are submissive, whereas, some are self-confident, independent and high-spirited. In the contemporary period women were not given freedom to choose their own life-partners. This is seen in '*A Midsummer Night's Dream*' where Hermia is brought in the court of Theseus by her father, Egeus, who wants her to marry his choice, Demetrius, in spite of the fact that she loves Lysander. The Duke gives Hermia four days to agree to marry Demetrius, failing which she would either die, or be put in a nunnery permanently. Therefore she is subjugated by the patriarchal society. In '*Hamlet*' Ophelia's suicide is a kind of silent protest against such patriarchal codes. The construction of female characters in Shakespeare's plays reflect the Elizabethan image of woman in general.

The picture of the 18th century England is reflected in the social life painted in Alexander Pope's '*The Rape of the Lock*' where the satire is mainly directed on the degeneration of women of the time. Pope scrutinised in minute details feminine whims, follies, foibles and pretensions, and hold them up to ridicule. The poet shows how the fashionable and rich lady of the time would drowse and dream away half of the morning in her bed, until her lapdog waked her up. The toilette scene in this mock-epic describes the flirtatious fashion-style of the contemporary women. For them husbands and lapdogs were merely interchangeable commodities, their fondness for both being equally shallow. Hence he says:

"Not louder Shrieks to pitying Heav'ns are cast,
When Husbands or when Lap-dogs breathe their last."

During the late 18th century and early 19th century women had a very limited role and were considered as inferior or the 'weaker sex'. So, in order to change the mind set of the people Jane Austen presented her women characters as self-confident, intelligent and who were able to take decisions by themselves. '*Pride and Prejudice*', '*Emma*' and '*Sense and Sensibility*' are some of her works worth mentioning.

Thomas Hardy, D.H. Lawrence, E.M. Forster and Virginia Woolf have all made significant contributions to the perception of women in the literary canon, particularly in challenging traditional norms about the 'chastity' of women. Hardy's '*Tess of the D'Urberville*' is one such example. Virginia

Woolf's '*Mrs. Dalloway*' is an unconventional novel which describes Mrs. Clarissa Dalloway's life events within the span of a single day. The author uses stream of consciousness to show the spontaneous flow of her memory where she leaps between her past and present.

George Bernard Shaw's '*Pygmalion*' is a criticism of social barriers and class distinctions and it upholds the ideal of equal opportunity, of wealth and education for all regardless of class and gender. In this play, Higgins transforms a common flower-girl, Eliza into a graceful lady. By the end of the play it is seen that Eliza marries her own choice Freddy Hill and also starts running a fashionable greengrocer shop. She gradually transforms herself into an independent fascinating lady from a shabby Cockney speaking flower-girl.

In J.M. Synge's '*Riders to the Sea*', Maurya is the tragic-queen who has lost eight men to the sea. Even at the time of her worst misfortune she does not complain about the cruelty of God or Destiny. She is full of dignity, honour, courage and calmness. Her sufferings are great but she rises above them all and proves to be a true tragic protagonist.

Literature is considered as the reality of society defined in words. Indian Literature also provides ample of examples on women in literature. Speaking of the women writers, it was Toru Dutt who pioneered the Indian women's English literary tradition. Her work depicts archetypes of Indian womanhood showing women in suffering, self-sacrificing roles, reinforcing conventional myths in a patriotic manner. Kamala Das' poem '*An Introduction*' is a confessional autobiographical poem where she frankly speaks about her birth, her growth as a woman, her likings and desires. She also speaks of the male chauvinistic society which constantly tries to pull women down. This poem is a feminine demand for recognizing their claim as an independent individual, and not simply a woman.

In Anita Desai's '*Voices in the City*', women are shown as both progressive and traditional, domesticated and warrior. In this time, women were doubly colonised – both by British and Indian men. The character Monisha is sexually colonised and her suicidal act is a kind of silent protest against patriarchy. Mahesh Dattani's '*Bravely Fought the Queen*' shows how the male-dominated society prunes the dreams of women like a bonsai plant. He portrays the stereotypical domineering mother-in-law of today's society in the role of Baa. Baa herself had been a victim of abuse at the hands of her uncouth, rough and loutish husband who used to beat her up. Ironically with a change in her status, this once oppressed woman becomes herself an instrument of oppression and colludes with her sons in bullying and blackmailing her two daughters-in-law. All the incidents in the play point towards a tentative female challenge and resistance against the traditional gender identities.

In Hindi Literature, the name of Mahadevi Verma is the most popular. She is a freedom fighter, educationist and activist who wrote on women issues, politics, social reform and female sexuality. Another renowned writer Jai Shankar Prasad is well-known for his strong portrayal of women and glorifying them. More recently, contemporary popular fictionwriters like Chetan Bhagat and Anita Nair have showcased the new woman in their books. Therefore, the transformation of women through ages have been noted in literature.

Now, even film industry is taking on real grim issues of women's life to make films on women issues and send a social message to its audience through movies such as '*PadMan*', '*Chhapaak*', '*Highway*', '*Ki and Ka*', '*Parineeta*' and many more. '*Chhapaak*' is the story of a nineteen year old girl who is subjected to a horrific acid attack. But she resolves to fight for justice and reclaim her life. The film '*PadMan*' speaks about menstruation of women which was never spoken publicly before. In '*Ki and Ka*' the gender roles are reversed where the woman of the house goes out for working and earning money and the man looks after the household chores. This reversal of gender role challenges the mind set of the society. Thus, it is observed from the analysis that the present day world has started giving importance to women which was lacking earlier.

Women empowerment and gender equality:

The subject of empowerment of women has become a burning issue all over the world including India since last few decades. To delve deep into this matter, first let us know what women empowerment actually means. Women empowerment can be defined as "the process by which women gain power and control over their own lives and acquire the ability to make choices." Hence, empowerment of women means enhancing the self-respect, self-dignity of women, recognizing women's contribution, becoming economically independent, self-reliant and controlling resources like property and assets.

Women's quest for equality with man is a universal phenomenon. They have struggled to acquire equality with men in matters of education, employment, inheritance, marriage, politics and recently in the field of religion also to serve as cleric.

Now the question arises:

Why should we empower women and achieve gender equality?

Presently, it is observed that India offers a lot of opportunities to women. But it was completely the opposite in the earlier times. Previously, women were enslaved by men. They were considered as men's property. They were abused and tortured brutally both physically and mentally. In India even today, a woman's identity is dependent on her husband. She is known by somebody's daughter or wife or mother. Women could never raise their voice against societal norms and injustices towards them. But the time has changed now. People from all over the world are raising their voice for women empowerment and gender equality. It is the right of every woman to live with prestige and dignity. They now want to exercise equal position and power as men. Their quest for equality has given rise to the formation of many women associations and launching of movements.

A long struggle going back over a century has brought women the property rights, voting rights, an equality in civil rights in the eye of law in matters of marriage and employment. In addition to these rights in India, the customs of 'purdah' (veil system), female infanticide, child-marriage, sati system (self-immolation by the women with their dead husbands), dowry system and the state of permanent widowhood were either totally abolished or partially checked to an appreciable extent after independence through legislative measures.

- **Legislative measures for women in India**

Independence of India heralded the introduction of laws relating to women. The Constitution provided equality to men and women and also gave special protection to women to realise their interests effectively. The Constitution of India guarantees to all Indian women equality (Article 14), no discrimination by the state (Article 15(1)), equality of opportunity (Article 16), and equal pay for equal work (Article 39(d)). Two Acts have also been enacted to emancipate women in India. These are: Protection of women from Domestic Violence Act, 2005 and the Compulsory Registration of Marriage Act, 2006. The Domestic Violence Act recognises and checks any abuse against women – both physical and mental.

These legislative measures would help innumerable women in the country who are abandoned by their husbands and have no means of proving their marital status. It would also help to check child marriage, bigamy and polygamy, enable women to seek maintenance and custody of their children and widows can claim inheritance rights. The act is applicable on all women irrespective of caste, creed or religion. It would truly empower Indian women to exercise their rights

- **Women in different fields:**

We can now see women almost in every field: architecture, law, police service, financial services, engineering, medical, politics, sports and IT jobs. They have also entered service occupations such as a nurse, a beautician, a sales-worker, a waitress etc. They are increasingly and gradually seen marching into domains which were previously reserved for males – police, astronauts, driver, army, cricketer, pilot, loco-pilot, chartered accountants, commandos etc. Kalpana Chawla was the first Indian-born woman to go to space. Women have proved their mettle in the field of sports too. Dutee Chand, Hima Das, Mary Kom, Mithali Raj, Saina Nehwal, Geeta Phogat are some of the names who have made India proud with their achievements. In spite of their increasing number in every field, women still remain perhaps the world's most underutilized resources. Many are still excluded from being paid-work and many do not even get the opportunity to make use of their skills.

The working wives and educated mothers has affected the status of women in many ways. This not only empowers the women themselves, they can support their husbands more efficiently and nurture the young ones in a more systematic manner. After all, a mother is the first teacher of a child and the pre-school and Montessori teachers are mostly females. Thus, women should be educated first before the males, as they shape up the 'tabularasa' of the children – the future of a country and makes them better citizens. It is said that, "Educate a man, you educate an individual; Educate a woman, you educate a generation." Hence education of women is of utmost importance.

- **Women in Politics:**

Apart from the different fields, women are seen to take active participation in politics too. Today we have women chief ministers, women presidents and women political party leaders. Among them the most notable ones are Late Indira Gandhi, Mamata Banerjee, Sonia Gandhi, Mayawati, late Sushma Swaraj, late Jayalalitha, Pratibha Patel and many more.

- **Economic Independence**

Empowerment of women would also mean equipping women to be economically independent. Women empowerment and economic development are closely related to each other. Economic development of a country with men alone can never be possible. The rapid pace of economic development has increased the demand for educated female labour force almost in all fields. Today women are playing larger roles in the economic field: as workers, consumers, entrepreneurs, managers, employers, businesswoman and investors. Women are now earning as much as their husbands do, and in some cases, even more than their husbands. This new phenomenon has also given economic power in the hands of women for which they were earlier totally dependent on males. Economically independent women feel more confident about their abilities and personal lives. This enables them to take personal decisions for instance, about their future education, jobs, marriage etc.

Sociologist, Robert Blood (1965) observes, "Employment emancipates women from the domination by their husbands and secondarily, raises their daughters from inferiority to their brothers." In brief, economic independence of women shape their overall equations, perspective and outlook.

Conclusion:

Women have transformed slowly and gradually. In some periods their position is raised while in other, they are regarded as weak and incapable. Life for women have always been a roller coaster ride. They face many difficulties but still stand strong and erect. We could have never known the position and status of women of the earlier times if it were not penned in literature. The writings in literature say it all. As we go through those writings in the form of poetry, novels or plays; we feel as if we are living that contemporary period. But now a lot has changed through these passing years. In the 21st century the voice of women empowerment and gender equality is heard from all over the world. The discrimination against women have reduced to a certain level. Now-a-days women in India participate in all activities which were earlier only dreamt of. It took a lot of strength, courage and hard work for women to achieve this position today. Still it cannot be claimed that empowerment of womanhood is achieved totally.

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EFFECTS OF AIR POLLUTION ON THE RESPIRATORY HEALTH OF INDIVIDUALS IN KOLKATA

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ABSTRACT:

Air pollution contributed by vehicular traffic is one of the largest environmental problems of today. Alongside other factors adversely impacting air quality such as the combustion from industries, deforestation, household and farming chemicals, smoking etc., emissions from vehicular smoke is also a major source of air pollution. This paper focuses on the air pollutants which result from vehicular traffic and their impact on the respiratory health of individuals in the urban metropolitan city of Kolkata, by means of a regression analysis using data of pollutant concentration levels in nine specific geographic zones of Kolkata along with individual level health data of 110 respondents.

Road transport accounts for a significant portion of air pollution in all cities and towns, emitting toxic gases like NO₂ (from the burning of fuel) and particulate matters (also known as atmospheric aerosol particles, atmospheric particulate matter, particulate matter, or suspended particulate matter) like PM₁₀, PM_{2.5} and smog, all of which lead to the degradation of air quality. Health is affected negatively, leading to an increase in morbidity and mortality rates. An Air Quality Index (AQI) is used by government agencies to communicate to the public how polluted the air of a city is at any given period of time, or how polluted it is forecasted to become in the near future. Public health risks increase as the AQI rises.

Primary data on road traffic was used for the analysis presented in this paper. Alongside, a survey was conducted online to collect primary health data on 110 respondents, primarily from the millennial age group (younger population). NO₂ and PM₁₀ were chosen amongst other pollutants, since they are very closely related to the automobile emissions, and their impact on respiratory health was analyzed using this data. A logistic regression model was used to estimate the chances of developing a respiratory illness as a result of NO₂ and PM₁₀ concentrations attributable to traffic for different traffic volumes during rush hour periods in the city.

It is seen that with increase in concentration levels of NO₂ and PM₁₀, the chances of developing respiratory illness among the target population increases, as can be expected. Additionally, there are other factors that play a role in increasing the chances of developing a respiratory condition among the urban young population of Kolkata. The most important of these include the frequency of use of public transport and family history of respiratory illness. As the usage of public transport increases, the chances of developing a respiratory illness increase. There is an increase in the chances of developing a respiratory illness in individuals with a family history of respiratory illness.

Government policies directed at reducing the level of vehicular emissions will consequently lead to improvement of air quality and hence reduce chances of development of respiratory conditions. These policies, along with more awareness and vigilant measures on part of each individual, is required for controlling the harmful effects of air pollution and combating this evil.

INTRODUCTION

This paper discusses the effects of air pollutants on the respiratory health of individuals in the urban pockets of the Kolkata metropolitan city. The increased occurrence of air pollution in all metropolitan cities is of major concern to the general public. One of the primary reasons behind Kolkata being heavily polluted from vehicular emissions is the rampant usage of kerosene-mixed diesel by auto-rickshaw drivers in Kolkata metropolitan areas.

Different countries have their own air quality indices, corresponding to different national air quality standards. In India, The National AQI was launched in New Delhi on September 17, 2014, under the Swachh Bharat Abhiyan program. The Central Pollution Control Board, along with State Pollution Control Boards, has been operating National Air Monitoring Program (NAMP), covering 240 cities of the country and has more than 342 monitoring stations. Kolkata has 7 automated air quality monitoring stations and 16 manual ones. The AQI in Kolkata of 343 in November 2019 (recorded at the automated air monitoring station of Fort William, Kolkata) resulted in the city falling in a very poor air quality category in 2019.

The data used in the model is primarily in three parts:

1. Data on traffic has been collected by means of primary data collection methods as traffic counts of major junctions in the city during rush hours on a weekday.
2. Data on pollutants PM_{10} and NO_2 has been collected from the pollution control board website.
3. The health information has been collected via an online survey of young population of the metropolitan city.

NO_2 inflames the lining of the lungs and can reduce the immunity to lung infection causing problems such as wheezing, coughing, cold, flu and bronchitis. NO_2 can also cause irritation of eyes nose and throat.

PM_{10} (having a diameter of 10 micro meter or smaller) in air are very small particles which are found in dust and smoke. Exposures to a high range of PM_{10} can lead to a number of health impacts ranging from coughing, breathing, asthma attacks and bronchitis to high blood pressure, strokes and pre-matured death. It increases cardio-pulmonary deaths and the risks of non-allergic respiratory symptoms and diseases.

The methodology that has been used is logistic regression since the respiratory illness is captured as a binary variable in the Yes/No format. A number of explanatory variables have been used to test the corresponding impact on the respiratory health of individuals, apart from the

pollutants in focus, such as the family history of respiratory conditions, the exposure to smoke (active and passive), the distance of the individual's residence from the main road etc. Not all of these factors play an equally important role in explaining significantly the chances of developing respiratory illness.

The paper is organized as follows. Section 2 describes the methodology employed in data collection as well as statistical analysis. Section 3 summarizes the analysis and results as obtained from the statistical package R. Section 4 provides a concluding discussion, including some policy suggestions.

METHODOLOGY:

DATA COLLECTION:

The traffic data has been collected as primary data as described below.

A total of nine air monitoring stations (both automated and manual) in Kolkata were chosen on the basis of best data availability and the important road junctions nearest to the stations were chosen to get the traffic counts of those places. Traffic data was collected on selected weekday rush hours for the following areas:

- Ballygunge
- Victoria
- Belegkata
- Jadavpur
- Rajarhat
- Dum Dum
- Salt Lake
- Tollygunge
- Moulali

Monitoring points were set up in each of the zones and monitoring was carried out for 1 hour at ground level. Attempts were made to observe a fixed time schedule for monitoring the traffic data during the rush hours (0900 – 1000 hours and 1500 – 1600 hours).

The data on pollutants was sourced from government websites as described as below.

Data on the concentration of PM_{10} and NO_2 in the air has been obtained from the official website of WEST BENGAL POLLUTION CONTROL BOARD, for those specific days on which the traffic survey was carried out, to maintain consistency between the collection of traffic data and the level of pollutants in the air.

Data on the health of individuals was collected by means of online primary data collection through Google forms. The process has been described below.

A health survey was conducted to get the responses of individuals (targeting the young population between age 18 years to 28 years) to get sufficient data on their respiratory condition,

family's history of respiratory illness, exposure to smoke, proximity of their homes from congested roads and level of usage of public transport, frequency of them stepping out of their homes.

MODEL METHODOLOGY

For the analysis of the data, a logistic regression was carried out using R. Logistic regression is a statistical model that in its basic form uses a logistic function to model a binary dependent variable, although many more complex extensions exist. In regression analysis, logistic regression (or logit regression) is estimating the parameters of a logistic model (a form of binary regression). Mathematically, a binary logistic model has a dependent variable with two possible values, such as pass/fail which is represented by an indicator variable, where the two values are labeled "0" and "1". In the logistic model, the log-odds (the logarithm of the odds) for the value labeled "1" is a linear combination of one or more independent variables ("predictors"); the independent variables can each be a binary variable (two classes, coded by an indicator variable) or a continuous variable (any real value). The corresponding probability of the value labeled "1" can vary between 0 (certainly the value "0") and 1 (certainly the value "1"), hence the labeling; the function that converts log-odds to probability is the logistic function, hence the name. The unit of measurement for the log-odds scale is called a logit, from logistic unit, hence the alternative names. The defining characteristic of the logistic model is that increasing one of the independent variables multiplicatively scales the odds of the given outcome at a constant rate, with each independent variable having its own parameter; for a binary dependent variable this generalizes the odds ratio.

R is a programming language for statistical computing and graphics supported by the R Foundation for Statistical Computing. The R language is widely used among statisticians and data miners for developing statistical software and data analysis.

ANALYSIS AND RESULTS:

DATA DESCRIPTION:

VARIABLE DESCRIPTION:

A cut of the data that has been used for the model has been provided in the Appendix. The variables have been described below.

- Age and Gender denote the demographics of the individual.
- Distance_Home refers to the distance of the individual's home from the main road.
- Step_Out refers to the frequency of the individual stepping out of their house, and it is measured on an ordinal scale where 1 denotes rarely stepping out and 5 denotes stepping out very frequently.
- Resp_Issue denotes whether the individual has any respiratory problem or not. This is the response variable in our model and it takes a 0 (No) and 1 (Yes) format.
- History refers to if anyone in the family of the individual has any history of respiratory problem or not.

- Smoker refers to whether the individual smokes or not.
- Passive_Smoking refers to if the individuals who are exposed to second hand and third hand smoke by breathing ambient air consisting of toxic substances from the combustion of tobacco products.
- Transport refers to the frequency of usage of public transportation for commute.
- Area denotes the location of the individual's residence among one of the nine regions in focus for the study.
- Pollutant_1 is PM₁₀, which are very small particles found in dust and smoke, having a diameter of 10 micrometer.
- Pollutant_2 is NO₂, which is primarily released in the air from the burning of fuel. Emissions from cars, trucks and buses mainly contribute to the rise in NO₂ concentration in the air.
- Traffic refers to the total number vehicles in an area taken for the traffic survey on that particular date, measured in each of the nine regions in focus for the study.

DISTRIBUTION OF DATA:

■ The sample consists of individuals in the age range of 18 years to 28 years. The gender distribution of the 110 respondents has been provided in Fig 1

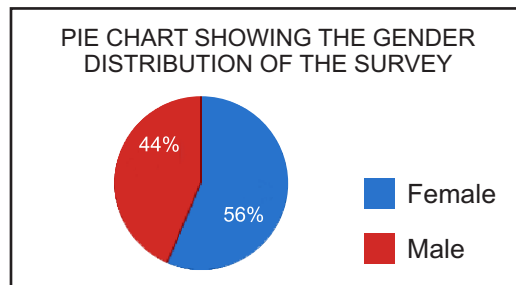


Fig 1

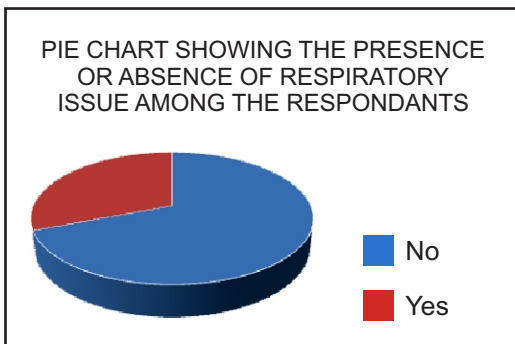


Fig 2

31% of the sample data collected has some or the other form of respiratory illness. Since this variable is used as the response variable in the regression model, this sample can be considered to be a good representation of the population, since it has a balanced mix of 1 (presence of respiratory illness) and 0 (absence of respiratory illness). It is interesting to note that most of the individuals with respiratory illness have developed these conditions over time (Fig 2).

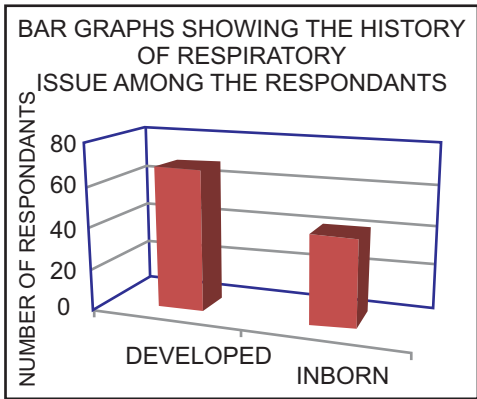


Fig 3

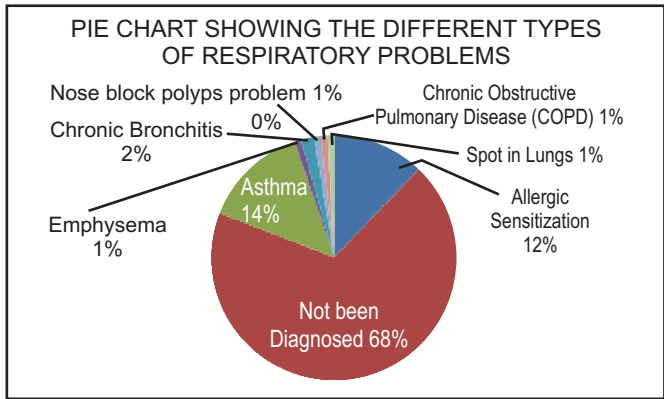


Fig 4

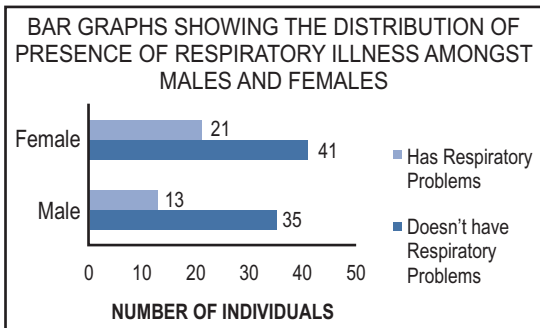


Fig 5

The following pie graph shows the family history (Fig 3) of presence of respiratory illness has been shown below for the respondents who themselves have some respiratory condition. It shows that the majority of the people do not have any family history of respiratory illness which accounts for 68% of the people (Fig 4) with respiratory problems in the sample. Only 32% of the individuals with respiratory problems have a family history.

The distribution of individuals with presence of respiratory illness is evenly distributed between both genders, given the sample distribution of gender. This has been depicted below (Fig 5). Family history of asthma deserves special mention in this paper (Fig 6)

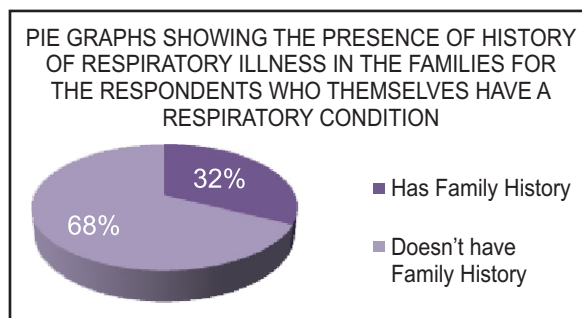
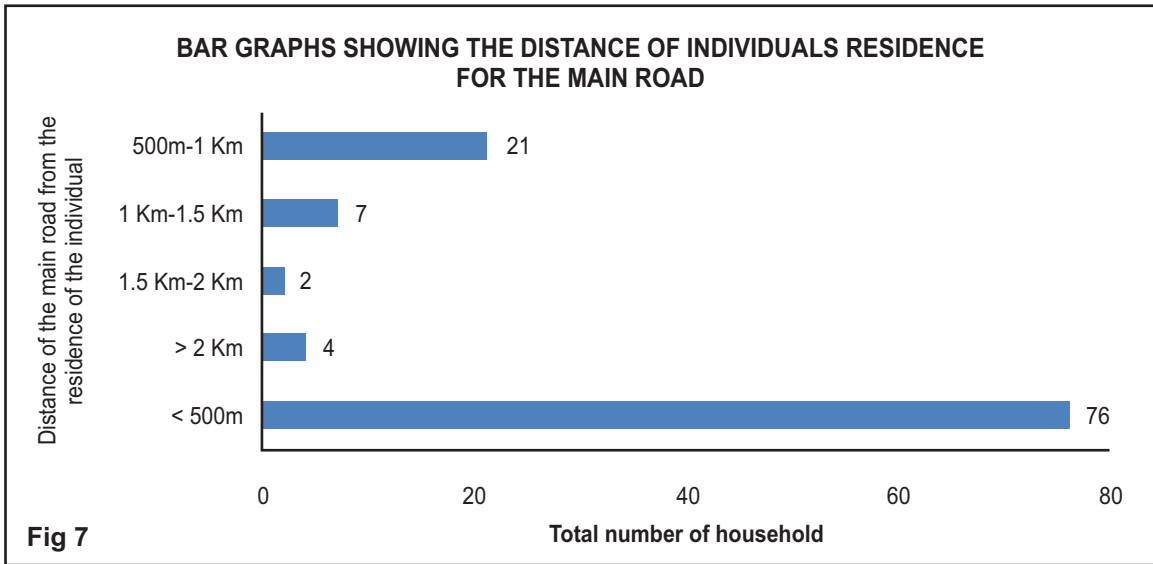
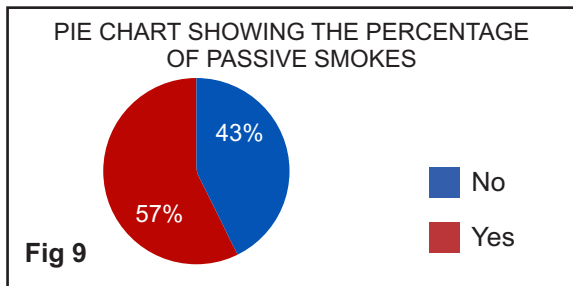
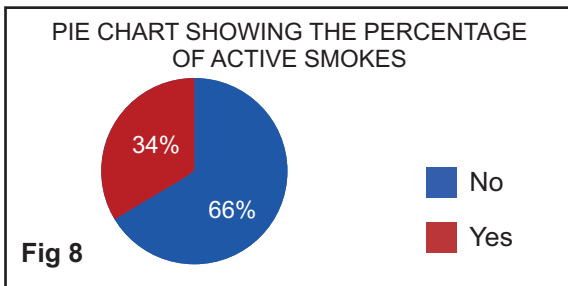


Fig 6

(Fig 7) shows the distance of the individual's house from the main road, where, y-axis shows the distance of the main road from their house and x-axis shows the number of individuals. A total of 110 samples have been collected and it has been found that maximum individuals (76) stay near the main road, i.e. within 500m and the only 2 individuals stay more than 2km away from the main road.

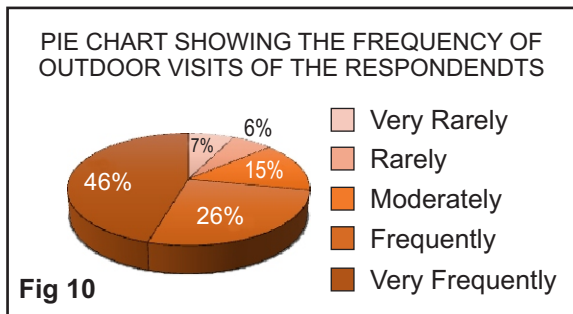


■ The exposure to active and passive smoke for individuals(Figs 8, 9) has been shown below.



■ The frequency of stepping outside the residence was recorded on an ordinal scale. We can see that most of the sample has a high frequency of stepping out, as can be expected from the age group under consideration(Fig 10).

■ The usage of public transportation was also measured on a ordinal scale. Most of the sample shows a high exposure to public transportation. The following figure (Fig 11)shows how often an individual uses public transport. Here, y-axis denotes the number of individuals and x-axis denotes the frequency of the individuals using the



public transport, where 1 means very rarely and 10 refers to always availing public transport. From the diagram, we can see that 48 individuals always travel in public transport, out of 110. It can be seen from the diagram that about 76% of the entire sample avails public transport quite frequently.

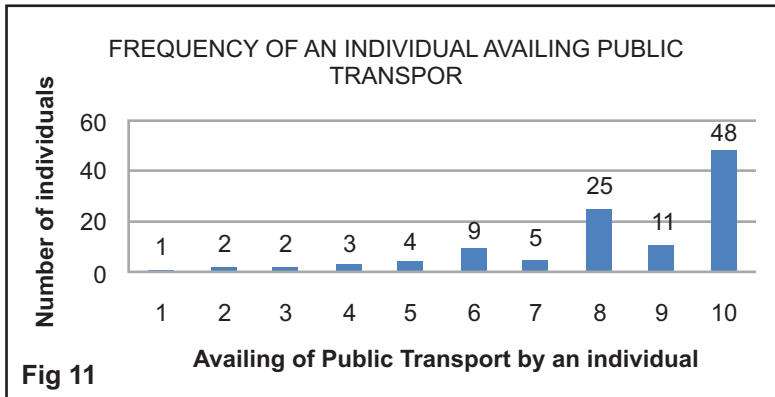


Fig 11

■ There were no major concerns around the distribution of the sample. The sample covers a good number of individuals with respiratory illness present, thus making the modelling base strong. The variables to be considered as having influence on the response variable are also well

distributed among the sample collected, and not skewed or biased towards any one category.

CORRELATION BETWEEN VARIABLES

An important part of the analysis is to check the directional relationship between the traffic data collected and the concentration levels of the pollutants, based on the areas for which the data has been collected. It is expected that with increase in the traffic, there would be an increase in the level of pollution and hence an increase in the concentration of PM₁₀ (Fig 12) and NO₂ (Fig 13) in the air.

The pollutant levels and traffic data have been mapped area-wise to each respondent in the sample. The correlation between the traffic data and each pollutant has been analyzed after that. The observations are provided below.

1. There is a positive correlation between the volume of traffic and PM₁₀ (Pollutant 1) of around 45%.
2. There is a positive correlation between the volume of traffic and NO₂ (Pollutant 2) of around 48%.

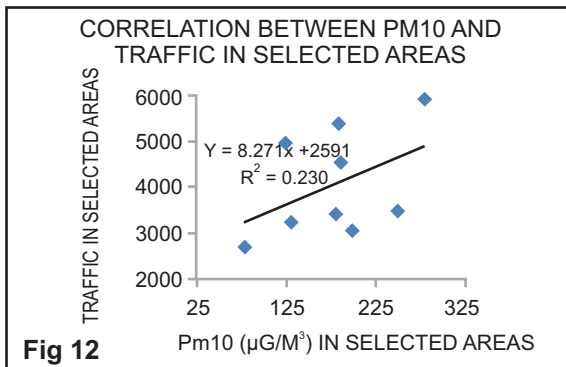


Fig 12

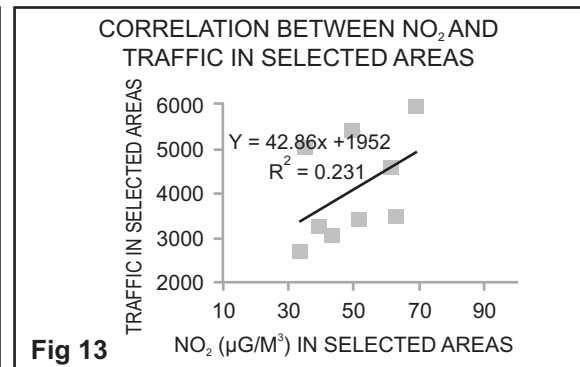
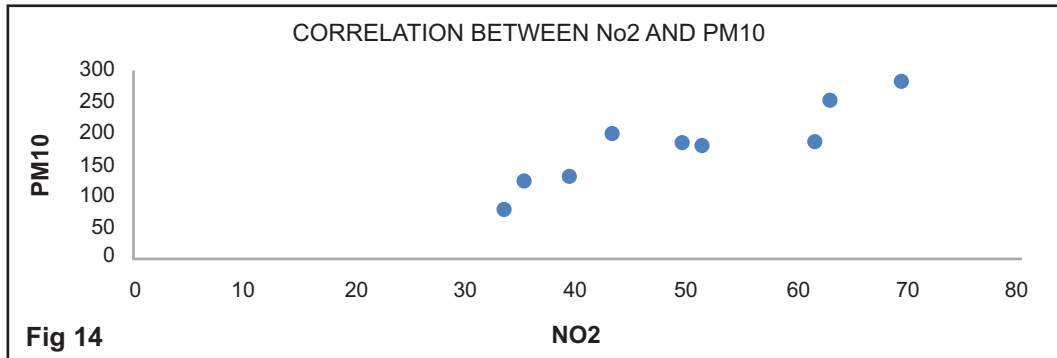


Fig 13

Additionally, it is important to analyze the correlation between the two pollutants themselves, especially from the perspective of model specification. We can see that there is a strong positive correlation between PM₁₀ and NO₂, which is expected. The graph below shows an increasing trend (positive slope) confirming the positive relationship between these two pollutants.



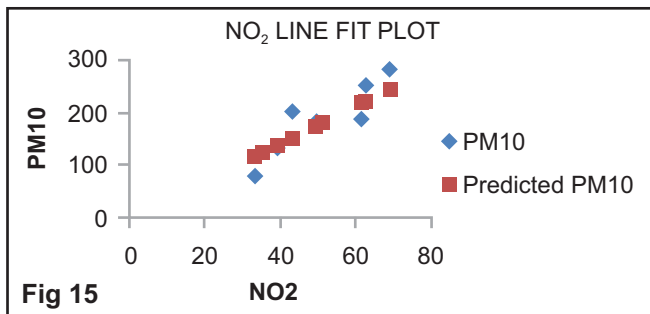
In order to affirm this further and quantify the degree of association, we have performed a regression analysis using the individual level data for these two pollutants: where PM₁₀ has been regressed on NO₂ (Fig 14). The reader can also regress NO₂ on PM₁₀ to ascertain the strong positive relationship between them. The R-Squared from the regression is 81%, showing that there is a very strong relationship between PM₁₀ and NO₂.

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0.812669
R Square	0.660431
Adjusted R Square	0.657553
Standard Error	26.88808

Table 1

AVONA	df	SS	MS	F	Significance F
Regression	1	165920.6	165920.6	229.4989672	1.89716E-29
Residual	118	85310.32	722.9688		
Total	119	251230.9			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95%	Upper 95%
Intercept	-4.063966344	13.1018117	-0.310183541	0.756968552	-30.00912047	21.88118778	-30.00912047	21.88118778



Thus, if both these variables are included in the subsequent regression analysis to test the impact of pollutants on respiratory illness, there might be a problem of multicollinearity. This has been shown subsequently. As a result, the model specification is to first include only PM₁₀ and check the impact on respiratory illness and then include only NO₂ and check the impact on respiratory illness (Fig 15).

MODEL

The aim of this analysis is to see the impact of a number of causal factors on the respiratory conditions of individuals. The respiratory condition is a binary variable in our context, taking values Yes (1) and No (0). Since the response variable (respiratory condition) is binary, the method adopted for assessing the impact of various factors on the respiratory conditions is logistic regression.

The binary response variable has been first regressed on Gender, the individual's distance from the main road, the frequency at which the individual steps out of his/her home, his/her family history of respiratory illness, whether the individual is a smoker or not, whether the individual is exposed to passive smoking or not, how frequently he/she travels using public transport, the level of NO₂ in the area that the individual resides in, the level of PM₁₀ in the area that the individual resides in, and the amount of traffic in area the individual resides in. As expected, under this set-up, neither of the two pollutants are significant in explaining the respiratory condition, due to presence of multicollinearity.

As a result, a choice was made to first drop the NO₂ variable from the regression, while keeping all the other explanatory variables in the model. It is seen that PM₁₀ is now significant in explaining the respiratory condition of individuals in the sample. Alongside, use of public transport, and family history of respiratory illness both have significant impact in explaining the respiratory condition of individuals. However, it is important to note that the other variables - the gender, distance of the individual's residence from the main road, the frequency of stepping out, being a smoker or being subject to passive smoking or the amount of traffic in the area do not significantly explain the chances of possessing a respiratory condition.

FINAL MODEL 1: LOGISTIC REGRESSION TO CHECK IMPACT OF PM₁₀:

Thus, in the final model, only three explanatory variables: the family history of respiratory illness, the usage of public transport, and the level of PM₁₀ in the area of residence of the individual were considered. The results have been presented below. We make the following observations:

Table 2

```
> logisticSC <- glm(Y ~ pollutant_1 + History + Transport, data = data2, family = "binomial")
> summary(logisticSC)
```

Call :

```
glm (formula = Y ~ Pollutant_1 + History + Transport, family = "binomial", data = data2)
```

Deviance Residuals

Min	1Q	Median	3Q	Max
-1.9009	-0.6591	-0.4605	0.8050	2.6437

Coefficients :

	Estimate	Std. Error	Z Value	Pr (> Z)
(Intercept	-7.371547	1.903621	-3.872	0.000108 ***
Pollutant_1	0.011972	0.005563	2.152	0.031400 *
History Yes	2.297012	0.539079	4.261	2.04e-05 ***
Transport	0.371270	0.156835	2.367	0.017920 *

Signif. codes : 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
(Dispersion parameter for binomial family taken to be 1)

Null deviance : 136.04 on 109 degrees of freedom
 Residual deviance : 104.43 on 106 degrees of freedom
 AIC : 112.43

- ❖ The overall fit of the model is now better than when all the explanatory variables were included. The AIC (Akaike Information Criterion, a measure of goodness of fit for a model - the lower the better) is 112.43, compared to 121.81 when all the insignificant variables were also kept in the model.
- ❖ PM₁₀ is significant at 5% level of significance in explaining the chances of having a respiratory condition. For an increase in PM₁₀ level by 1 microgram per meter squared, the log odds of having a respiratory illness (over not having it) increases by 1.2%.
- ❖ The family history of respiratory illness is significant at 0.1% level of significance. For an individual who has a family history of respiratory illness (i.e. a family member with respiratory illness), the increase in the log odds of having a respiratory illness (over not having it) over an individual that does not have family history of respiratory illness is 230%.
- ❖ The usage of public transport is significant at 5% level of significance. For an increase in the degree of usage of public transport by one level (note that the data was sourced on an ordinal scale from the respondents), the log odds of having a respiratory condition (over not having it) increases by 37%.
- ❖ The Pseudo-RSQ of the model is around 23%, which is not very high, however, it is to be noted that the quality of the model can be improved by more data collection to be used in the model. As such, the focus of this study is primarily on the impact of pollutants on the chances of developing a respiratory condition, hence it is a modeling choice to go ahead with the RSQ value of 23%.
- ❖ The confusion matrix gives an idea of the correct predictions (i.e. the 1s have been classified/predicted as 1 and the 0s as 0). Since the predictions obtained from the logistic regression are probabilities, a threshold of 50% has been considered for classification into 1 and 0. The confusion matrix has been depicted below. As can be seen, the mis-classification rate is only about 20%, indicating a good model.

```
> data2$pred_y_prob = logistic5C$fitted.values
> data2$pred_y = ifelse (data2$pred_y_prob >= 0.5, 1, 0)
> xtabs (~Y + pred_y, data = data2)
  pred_y
Y      0  1
  0   67  9
  1   13 21
> mis_rate = (9 + 13) / 110
> |
```

FINAL MODEL 2: LOGISTIC REGRESSION TO CHECK IMPACT OF NO₂:

The same regression has been repeated, now with NO₂ instead of PM₁₀. The results have been presented below. The results are similar to what was observed for the first regression. The AIC for this model is lower, around 111.7, indicating it is a slightly improved model over the one with PM₁₀ as the explanatory variable out of the two pollutant options. Additionally, the Pseudo-RSQ is also slightly higher for this model, c24%.

Table 3

```
> logistic5B <- glm(Y ~ pollutant_2 + History + Transport, data = data2, family = "binomial")
> summary(logistic5B)
```

Call :

```
glm (formula = Y ~ Pollutant_2 + History + Transport, family = "binomial", data = data2)
```

Deviance Residuals

Min	1Q	Median	3Q	Max
-1.8351	-0.8005	-0.4035	0.7351	2.6107

Coefficients :

	Estimate	Std. Error	Z Value	Pr (> Z)
(Intercept	-8.36119	2.19494	-3.809	0.000139 ***
Pollutant_1	0.05805	0.02550	2.276	0.022818 *
History Yes	2.37719	0.55128	4.312	1.62e-05 ***
Transport	0.38152	0.16009	2.383	0.017166 *

Signif. codes : 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance : 136.04 on 109 degrees of freedom

Residual deviance : 103.70 on 106 degrees of freedom

AIC : 111.7

The important observations are as below:

- ❖ NO₂ is significant at 5% level of significance in explaining the chances of having a respiratory condition. For an increase in NO₂ level by 1 microgram per metre squared, the log odds of having a respiratory illness (over not having it) increases by 5.8%.
- ❖ The family history of respiratory illness is significant at 0.1% level of significance. For an individual who has a family history of respiratory illness (i.e. a family member with respiratory illness), the increase in the log odds of having a respiratory illness (over not having it) over an individual that does not have family history of respiratory illness is 237%.
- ❖ The usage of public transport is significant at 5% level of significance. For an increase in the degree of usage of public transport by one level (note that the data was sourced on an ordinal scale from the respondents), the log odds of having a respiratory condition (over not having it) increases by 38%.

- ❖ The confusion matrix has been provided below. The mis-classification rate is higher at 21%, compared to the model with PM₁₀ in it. It is also important to note here that the number of false negatives is higher in this model compared to the model with PM₁₀ in it, thereby making this model slightly less capable of predicting the presence of respiratory illness when it is actually there compared to the model with PM₁₀ in it, or, in other words, the presence of Type II error is higher in this model.

Table 4

```
> data2$pred_y_prob = logistic5B$fitted.values
> data2$pred_y = ifelse (data2$pred_y_prob > = 0.5, 1, 0)
> xtabs (~ Y + pred_7, data = data2)
  pred_y
Y      0      1
  0    69     7
  1    16    18
> mis_rate = (16 + 7) / 110
> |
```

CONCLUSION

We see that with increase in the concentration of PM₁₀ and NO₂ in the air, the chances of developing a respiratory illness increases among the youth of the Kolkata metropolitan city. Although the family history of respiratory illness plays a bigger role in increasing the chances of developing a respiratory illness, as is expected since genetic influence would be an inherent strong reason why an individual might develop a respiratory condition, it is worth noting that the presence of toxic pollutants in the air adds to the chance of an individual developing a respiratory illness.

The model can be improved further as and when more sample data is available. Moreover, this project only looks into two primary pollutants; this analysis can be extended when more data is available on other pollutants. It is important to note that factors like wind direction, wind speed, bright sunlight, all determine quality of air at any given time, and hence in this extremely dynamic system, these factors along with temperature, humidity and synergies between pollutants in the atmosphere would also play a crucial role in determining the quality of air in a given area.

The pollutants PM₁₀ and NO₂ are the primary by-products of vehicular emission and to combat their influence on the air quality and consequently on respiratory health of residents, a number of measures must be adopted. These solutions have to be brought into effect at two levels – increased individual ownership and responsibility towards environmental health, and targeted policy decisions of the state and central governments of India towards better management of the air quality. Some areas that can be looked into have been listed below.

INDIVIDUAL RESPONSIBILITY:

- ❖ Switching off the engine while being parked or stuck in traffic; avoiding short journeys, trying to

combine several shorter trips, considering walking or cycling is both good for the health and reduces emission at the same time, improving air quality considerably.

- ❖ Dropping the speed because slower and steadier driving helps in saving fuel and reducing emissions.
- ❖ Taking care of the car will also help to reduce how it affects air quality. Getting the car serviced regularly will improve the car's emissions, which involves having the engine oil changed. The engine oil is what lubricates and cleans the engine resulting in lesser amount of particulate matters released in the air.
- ❖ Under-inflated tires means the car has to work harder and use more fuel, so keeping the tires pumped up also helps in reducing emissions.
- ❖ Devices like diesel particulate filters (DPFs) should be checked at regular intervals.
- ❖ While changing cars, one must keep in mind to make the most environmentally-friendly choice. Comparing cars of a similar type and size: petrol models will use more fuel than diesel but will generally produce less toxic emissions, older models will generally use more fuel and produce more toxic emissions than newer models.
- ❖ Hybrid vehicles and electric vehicles are even greener alternatives. Electric vehicles produce no exhaust emissions when being driven, meaning no impact on local air pollution.

TARGETED POLICY DECISIONS:

- ❖ Setting up of more air quality monitoring stations helps in keeping the pollution in check, and having regular data will help the governments in taking adequate measures.
- ❖ Plantation of more trees and greener alternatives to fossil fuels will help to keep the pollution in check.
- ❖ Installing air filters around metropolitan cities has helped reduce pollution and giving it better AQI indices. This effort should gain further momentum in all major metropolitan cities where the air pollution levels are generally higher and traffic is always steadily rising.
- ❖ In January 2019, the Government of India has launched the National Clean Air Program (NCAP), a five-year action plan to curb air pollution, build a pan-India air quality monitoring network, and improve citizen awareness. This will provide some thrust to combating air pollution levels in the country.
- ❖ The Diesel Emissions Reduction Act (DERA), which provided funding for owners to replace their diesel equipment sooner than legally required, resulted in decrease by 335,200 tons of NO₂ pollution and by 14,700 tons of particulate matter (PM_{2.5}) since 2008. As long as this is an on-going effort, it will have significant impact on improvement of air quality.
- ❖ Zurich has capped the number of parking spaces in the city, only allows a certain number of cars to ply at any point of time, and is building more car-free areas and tram lines. This kind of measure can easily be adopted in Indian metropolitan cities as well.

- ❖ An interesting step towards air quality improvement is a vertical forest being planted in Nanjing, eastern China, designed to absorb 25 tonnes of carbon dioxide a year and produce about 60 kg of oxygen per day. If even a quarter of that area is covered in India in a similar effort, the impact of air quality would be significant.
- ❖ Paris, for example, bans cars in many historic central districts on weekends, and similarly Delhi imposes odd-even bans on vehicles, makes public transport free during polluting events and encourages car-bike-sharing programmes. Such efforts across all metropolitan cities in India would further the improvement of urban air quality.
- ❖ Since a major source of air pollution in Kolkata is the fuel used by the auto-rickshaws, a strict monitoring and periodic checking of the fuel usage by the state government would have to be a crucial targeted policy decision towards improvement of air quality in the city.

A number of measures are already in place to combat the evil that is vehicular traffic air pollution. These efforts not only have to sustain themselves in the long run, but also similar efforts at both individual and collective level is the need of the hour. More awareness should be the key initiative taken up by the government to keep the momentum going on efforts to minimize vehicular emissions, which would in turn improve respiratory health of individuals in all metro cities.

ACKNOWLEDGMENT

Our heartiest appreciation and gratitude to our professor, Dr. Jayati Das who landed us this opportunity for us to work on this paper "Effects of air pollutants on respiratory health of individuals in Kolkata." Without her constant support in the hours of need, her encouragement and suggestions, whenever and wherever we went wrong, this paper would have been incomplete. We would like to extend our thanks to Ms. Sukanya Chakraborty, Data Analyst at HSBC, for helping us carry out the regression analysis and provide the paper an analytical touch. Different project works and research papers carried out by eminent personalities worldwide helped us to clear our concepts.

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STUDY OF POVERTY, MAN-ENVIRONMENT RELATIONSHIP AND OTHER PHYSIO-SOCIO-ECONOMIC FACTORS IN BATHANBARI VILLAGE, PASCHIM BURDWAN

Rajanya Manna, Geography Honours (Sem 5)

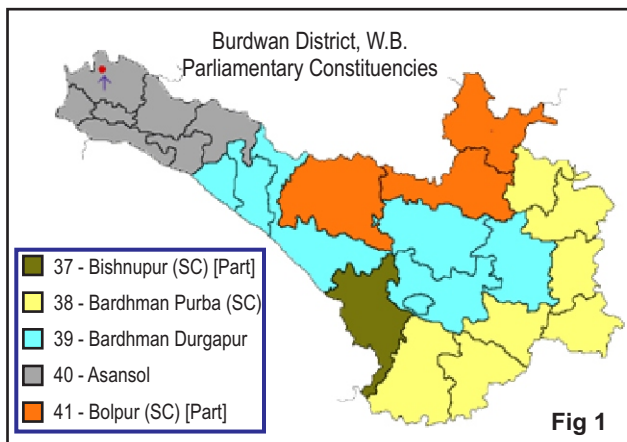
ABSTRACT

Field Survey of any area means a detailed study of the region to analyse the physiographic conditions, the economic resources base and the man-environment relationship. Such surveys help us to understand the life of the people and their sources of sustenance in totality. In our school, we conducted field survey in the Bathanbari village, Paschim Burdwan, to study about the problem of poverty, man-environment relationship and other physio-socio-economic perspectives in the village.

INTRODUCTION

Bathanbari is a medium-sized village located in Paschim Burdwan, with nearest town being Asansol. It comes under the Salanpur Tehsil and Dendua Gram Panchayat.

BATHANBARI



The laterite plain in the western part of the district, is made up of laterite, of in-situ origin. This region is highly unsuitable for agriculture. Our place of visit, Bathanbari village, lies in this region. The Barakar river is the main tributary of Damodar river which flows through the region visited by us.

The field survey that was conducted, had several interrelated stages –

● **DEFINING THE PROBLEM:** The problem undertaken by us was 'A STUDY

OF POVERTY IN BATHANBARI, PASCHIM BURDWAN, WEST BENGAL'.

- **OBJECTIVES:** The objectives of the survey undertaken were -
 - a) Study of the existing physiography and economic resource base
 - b) Understand the man-environment relationship
 - c) Analyse the socio-economic condition of the people living there
- **SCOPE:** The scope of the survey was de-limited in terms of physiographic area to be covered. The time frame was also a constraint.

METHODS-

- **TOOLS AND TECHNIQUES:** During our survey, we made use of two sets of questionnaire prepared by us. We interviewed the people to find answers to the questions we had framed. Each of us were assigned five households. On our return, we collected some more related data and maps from secondary sources.
- **COMPILATION AND ANALYSIS:** After returning from the survey, we compiled all the data collected by all of us and made an analysis.
- **CARTOGRAPHIC APPLICATION:** On the basis of the data collected, various graphs and diagrams were prepared,
- **PRESENTATION:** The field report was presented in such a manner that we get a holistic idea of the man-environment relationship in and around Bathanbari. More importantly, we have been able to assess the poverty level among the inhabitants of the village.

RESULTS-

After conducting the survey, we received quite a lot of data on various categories. Like, we found out the numeric concentration of different communities in the village (fig. 2), the male and female population of the village (fig. 3), occupational structure of the village (fig. 4)

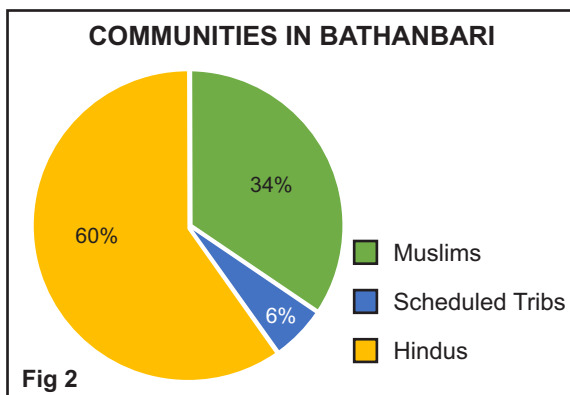


Fig 2
The concentration of HINDUS in the village is maximum, followed by MUSLIMS and SCHEDULED TRIBES.

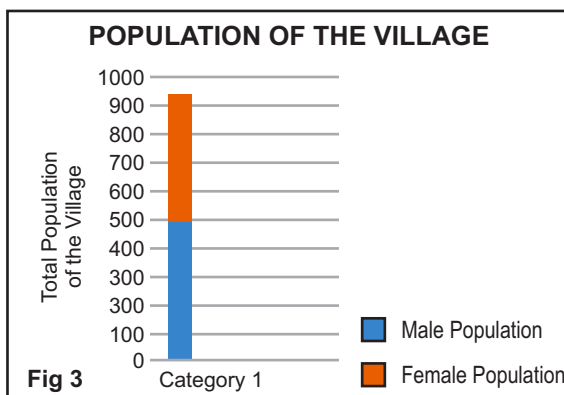


Fig 3
The village has a negative sex ratio as male population is more than the female population.

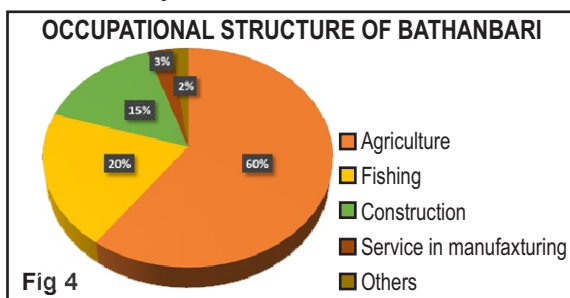
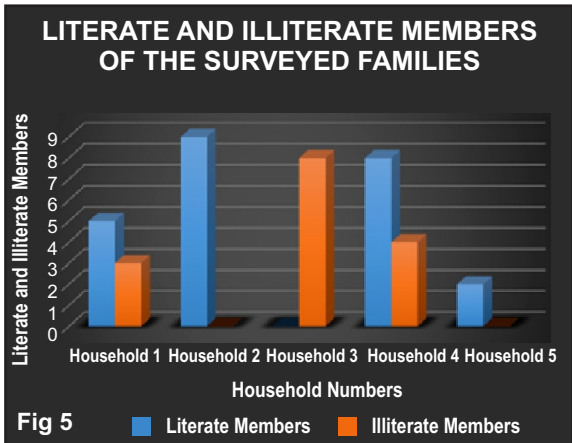
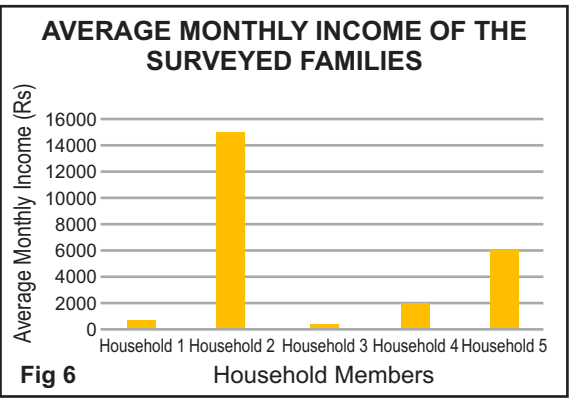


Fig 4
Though the village does not have soil and climate much suitable for agriculture, still the main occupation of the people is Agriculture.

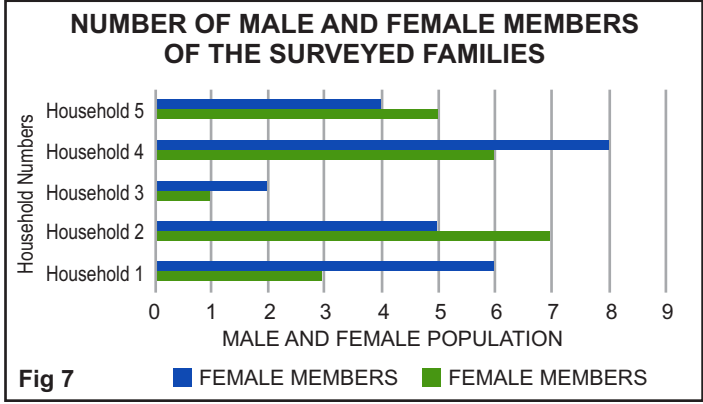
Apart from obtaining such general information, we mainly worked with the data obtained from the five households that each one of us surveyed. We obtained data like literate and illiterate members of the family (fig. 5), average monthly income of the surveyed families (fig. 6), number of male and female members of the surveyed families (fig. 7).



We cannot conclude that the literacy level is quite good since, we do have illiterate people in some households, but we have some literate people out there as well.



Well, we have quite a lot of disparity in the income distribution as we find the income of household 2 is comparatively very high as compared to household 3, which even do not have minimum income to support the members.



Though the village has a negative sex ratio, we find that 3 of the 5 households have positive sex ratio, which is quite remarkable. Very few people possess the ability and resources to attend higher studies. This mainly happens because of their poor economic condition which compel them to be a part of the workforce in order to supplement their family income. The villagers give prior importance to educating their daughters which reflect less gender discrimination. There is a self-help group in the village, run by women which enhances their position in the society. If the government provide little assistance, the village, which is otherwise backward, can surely prosper.

DISCUSSION

Bathanbari village, though located so close to the Maithon Dam area, presented a scene of deprivation and neglect. The villagers live on bare subsistence level and people are involved in a number of activities like farming, fishing, boating, etc. Many of the villagers work as daily wage workers. The good thing that we noticed about the village was the unity and cooperation among the three communities in the village. Most of the people in the village attended

ACKNOWLEDGEMENT

I would like to thank my project guides, my teachers for helping me in completing the survey. Also, the villagers were extremely cooperative and helped us by proving all the required data.

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<https://villageinfo.in/west-bengal/bardhaman/salanpur/bathanbari.htm>

- Can be delivered by your company (capabilities).
- That is different from your competitors.

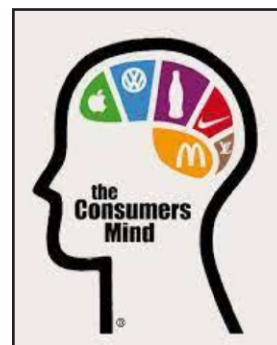
BRAND POSITIONING IN CUSTOMER'S MIND

To position a brand in a customer's mind, one must start from within. Every member of an organisation that touches the customer has to be the perfect expression of his position. And since everyone touches the customer in some way, everyone should be the best expression of the position.

Now comes the difficult part: Put up everything that represents the brand on a wall. List all the brand's touch points – every point of interaction with your customer. With a critical, yet intuitive eye, ask:

- How can I more fluidly communicate my brand's desired position?
- Does every touch point look, say, and feel like the brand I want my customers to perceive?

Many marketers don't have the clarity and conviction of following through on their words. Turn everything one does into an expression of his desired positioning and one can create something special. This takes courage to actively position the brand means one has to stand for something. Only then one truly is on his way to owning their own position in the mind of their customer.



STRONG BRAND POSITIONING AND WHY THEY WORK

APPLE – Apple is literally a textbook example of a strong brand. They're the first example Simon Sinek brings up in his Golden Circle framework, asking first why, then how and what.

Apple builds beautiful, innovative computers that are different than anything else you've experienced and markets them to resonate with their consumers.

Apple's message highlights the same qualities that they do in their consumers that they do in their products: if you are an Apple person you are also innovative, imaginative and creative.



Apple leaves price out of their branding and instead focuses on the value their products offer and the connection formed with their consumers.

NIKE – Nike started their product with a focus on performance and innovation. They invented the waffle shoe and built their brand targeting serious athletes. Their products offerings have now moved beyond shoes, and they offer athletic attire that enhances performances.

Their branding and messaging focuses on empowerment, from their taglines 'Just Do It' to their namesake, the Greek Goddess of Victory. Their models and athletes aren't smiling and happy, they're doing physical activities with their game faces on.

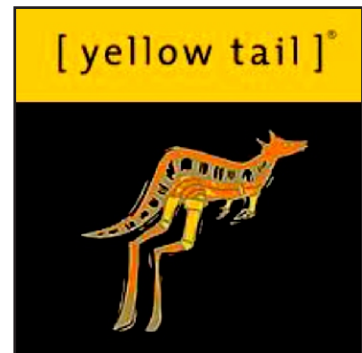


Nike's brand is focused on the concept of innovation for serious athletes to help you perform at your best every single time.

AUSTRALIAN YELLOW TAIL WINES

The objective was to enter the US Market and to be perceived very differently from the vast majority of wines brands, that all sell complicated products with sophisticated and hard-to-understand wine terminology. Yellow tail focused their positioning strategy on being perceived as:

THE PRODUCT: Yellow Tail developed a wine that is soft and sweet in taste and as approachable as beer and ready-to-drink cocktails. It resulted in an easy-drinking wine that did not require years of experience to develop an appreciation for it.



THE NAME: A fun and adventurous name that represents the tail of a kangaroo (as a reference to the Australian origin).

THE VISUAL IDENTITY: Designing a fun, colourful and unthreatening packaging design without complicated enological terms.

THE COMMUNICATION STRATEGY: Focusing their communication on in-store activities with brand ambassador that helped the product to be perceived as approachable and funny or down-to-earth ads.

THE PRICE: Offering a price of less than \$10 to fit is perceived as 'approachable' and being used at every festive occasion.

Two examples of positioning statements:

Amazon.com used the following positioning statement in 2001 (when it almost exclusively sold books): For World Wide Web users who enjoy books, Amazon.com is a retail bookseller that provides instant access to over 1.1 million books. Unlike traditional book retailers, Amazon.com provides a combination of extraordinary convenience, low prices, and comprehensive selection.

Zipcar.com used the following positioning statement when it established its business was founded in 2000: To urban-dwelling, educated techno-savvy consumers, when you use Zipcar car-sharing service instead of owning a car, you save money while reducing your carbon footprint.

Examples of taglines:

Mercedes-Benz – Engineered like no other car in the world.

BMW – The ultimate driving machine.

L’Oreal – Because you’re worth it.

Walmart – Always low prices. Always.

Nike – Just do it.

Coca-Cola – The real thing.

Volvo – For life.

PRODUCT RELAUNCH

A change to a product or the way it is sold, in order to make it available as a new product to increase sales is called product relaunch. It describes the restart or repositioning of brand. Its purpose is the brand’s strategic re-alignment. Many organisations in the world have undergone brand relaunch and done wonders. Change in global dynamics, bad advertising or marketing, losing relevance in current market scenarios as well are all a few reasons due to which ultimately comes a time when a brand stops being the consumer’s favourite. In the current world of constant new highs, it’s tough for brands to stay relevant.



The brand is positioned in the market with more focus and addresses a more specific target group. The relaunch is based on the peak performances of the company and a sustainable positioning. A brand relaunch is necessary particularly when brand attractiveness is declining consistently. This can have serious consequences such as slumping sales figures and shrinking competitiveness.

Old Spice is one such brand. Always known for its fragrances, Old Spice in the early 90s was losing relevance with the youth market due to its ‘meant for the older generations feel. Once P&G took over, the new ad campaign with a comic twist generated tens of millions of views on social media, instantly making the brand a popular fragrance brand with the younger generation.



Apple’s relaunch is a unicorn story known to all. From the desktops which at one point were taking a beating from windows in the early 90s to the launch of iPod, iPad, and then the iPhone. Steve Jobs’ ‘think different’ ad campaign challenged the world to look at Apple not just as an electronics company but as a lifestyle brand and it has done wonders for Apple. So much so that Apple became a \$1 Trillion Company in 2018.

While every successful brand relaunch is a remarkable story in itself, but none other are out there like what **Burberry** has been able to achieve. The famous English design was once so strongly associated with hooliganism in Britain that people even scoffed at former Prime Minister Tony Blair

for wearing one to a pub. So, from a couple of decades ago, a localised issue of being preferred gang wear to become one of the biggest luxury brands it is today is no small feat!



WHAT IS IMPORTANT FOR A BRAND RELAUNCH?

A brand relaunch helps to extend the life cycle of a brand. However, it offers not only opportunities but risks as well. Their effects must be considered. This is why it is enormously important from a brand strategic viewpoint that the brand core and with it the unmistakable identity of a brand takes a central role during the entire relaunch process. A strategically developed positioning is also essential; it has to be credible, attractive, superior, and therefore sustainable.

One of the most famous brand success stories is that of **Jägermeister**. It was known as a traditional brand that was preferred in downhome circles, because Jägermeister kept losing attractiveness, because the brand was not evolving. It was about to become obsolete. After a rejuvenating relaunch, the brand was successfully positioned with younger consumer groups and became established as a cult beverage in the event scene.



THE PERILS OF A RELAUNCH

Brand relaunch isn't easy and can be disastrous if not done right. It is also very expensive.

Pepsi spent \$211 million for their rebranding exercise back in 2008 including a whopping \$1 million for its logo design which is a lot of money when compared with Coca-Cola's strategy to use in the house design team to create their new logo.

The big question really is how do you know it's time for a brand relaunch?

Losing market share or downward market share trend is a clear indicator, however by the time these are highlighted, the brand would have already taken quite a beating. Some underlying pointers that hint towards brand relaunch:

1. When target audience doesn't identify the brand's strategy clearly.
2. Consistent marketing audits show lesser engagement with the brand.
3. Social media engagement doesn't reflect a positive trend.
4. A computer has better outreach or engagement.



It is important to outline the objectives for the relaunch. Is it to relaunch a brand that has failed due to an inappropriate marketing mix?

Or

reposition it for faster growth and market share?

HOW TO RELAUNCH A BRAND OR A PRODUCT?

The first thing to note is to not change everything about the brand. Keeping all the elements the same, one need to reposition the brand in the minds and hearts of customers. So, in essence, no



change is required for the product itself, distributed, or pricing but communication and positioning change for the perceived value of the brand. For e.g., if it's a product that needs relaunch, one could look at the packaging, or the logo, and the communication that goes along with it, while the name still remains the same. **Diet Coke** by Coca-Cola is the perfect example of it. While the name remains the same, packaging has changed, and it is being positioned as a refreshing drink meant for those who crave the Coca-Cola favour without the extra sugar, highlighting its

'same taste' ass of a regular Coca-Cola.

The second option would be to change everything about the product. Keeping the name but revamp everything else. Product ingredients, pricing, logo, packaging, and everything else. Bring it out as a new avatar and market accordingly. **Hyundai Santro**, a popular car in India, also known as Atos Internationally, is a completely new car Discontinued in 2015, Hyundai decided to relaunch the brand in India in 2018 due to its huge fan following and loyalty. Launched recently in 2018, the car already has quite a following and interest has been increasing amongst fans across social media channels.



CONSUMER SHIFT AND CONSUMER BUYING BEHAVIOUR AMONGST MIDDLE AGED TOWARDS MAGGI NOODLES AFTER ITS RELAUNCH

The research confirms the unfavourable influence of ban over general consumer sentiment about Maggi noodles. People are in dilemma of purchasing Maggi and product safety matters more than years of loyal brand association.

There are few reasons why investigating on consumer behaviour, and consumer shift is important. From the marketer's perspective, they will more understand the attitude of the consumers towards purchasing Maggi after the ban lifted and understand how ban affected the sale after its relaunch. From the result, they can know that enforcement of ban had a significant relationship with consumer purchase decision even after the ban was lifted. Besides that, they can also know that the factors influencing purchase decision and the other products in noodle market favoured by the consumers.

From the consumer's perspective, they will know the existing thoughts and perception of Maggi among the common population and also know the existing players of the noodle market. Last of all,

this study is beneficial for the academicians as this study could serve as a reference and may provide guidance for the future investigators who choose to study on the similar topic.



Toxic foods have been pushed into the Indian market by firms due to lack of regulation in India. Consumers are willing to purchase anything in the market without being health conscious unless the government takes any action against the harmful products. Hence it becomes necessity for the government to impose laws and tighten food standards and enforces them without any exemptions. Maggi had a

downfall due to ban enforced labeling them unhealthy for consumption and had a negative influence on sales. However, all this changed as Maggi enrolled in better marketing strategies. Maggi involved and connected to target audience especially the middle age group to assure them that Maggi is safe again. Maggi promoted awareness on the reason of ban and how they rectified the problem and reassured the consumers that Maggi is, in fact, healthy for consumption. Maggi has a high brand value, and the brand did everything necessary to reinstall the faith in the minds of its consumers.

RESEARCH METHODOLOGY

Research Methodology – Research Methodology is a way to systematically and scientifically solve the research problem. It may be understood as a science of studying how the research is done. In this, we study various steps that are adopted by researcher to know not only the research methods but also the methodology. The methodology is the practical aspect of the research that is required to arrive at a conclusion. Researchers need to understand the assumptions underlying various methods and they need to know the criteria by which they can decide that certain methods and procedures will be applicable to certain problems and others will not.

Research Design – Research Design refers to the overall strategy that a researcher integrates in a logical and coherent way to make sure that the research problem is affectively addressed. Research Design consists of three important terms -

- Plan
- Structure
- Strategy

Types of research design are –

- Exploratory Research
- Descriptive Research
- Causal Research

For this project report, Descriptive Research Design is adopted.

DATA COLLECTION METHOD

Primary Data – Primary Data is that data which is collected a fresh and for the first time and thus happen to be original in characters. A few methods are –

- Questionnaire
- Personal Interviews
- Telephonic Interviews
- Email Interviews

For this project report, only questionnaire has been used.

Secondary Data – Secondary Data is that which is already available. While collecting secondary data the researcher has to look into various sources from where one can obtain them. It is derived from the original sources and is re-processed for one's own purpose called secondary sources. A few examples are-

- Books
- Journals
- Articles
- Websites

For this project report, only websites has been used.

Questionnaire Design – Questionnaire Design consists of number of questions measuring the responses of the customers. The questionnaire design used in my questionnaire is a close ended questionnaire, having a limited number of answers from among which the respondents ticks the answer appropriate to them.

Sampling Size – When a survey is undertaken and when it is not possible to take the entire population under consideration for one's survey then the focus is drawn to a small part of the population. This small, divided part of population is called the sample size.

Sampling Area – Sampling Area refers to the process of subdividing the area to be sampled into smaller blocks that are then selected at random and the survey is done. The data is collected from primary as well as secondary sources.

Analysis

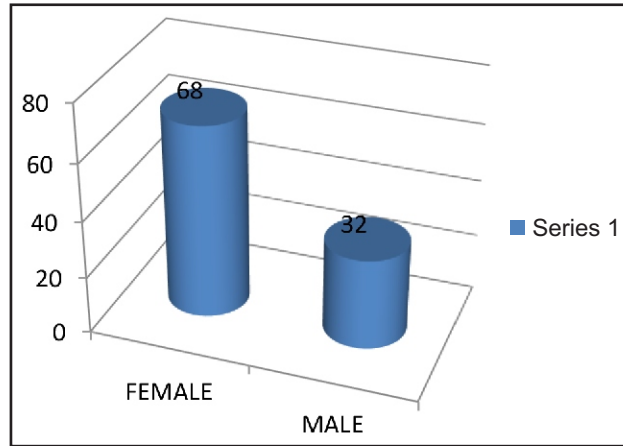
The analysis and interpretation is done on the basis of my primary data collection that is through the questionnaire.

According to the questionnaire there were a set of 11 questions presented in the questionnaire, which were given to the various respondents to fill.

From the responses of the respondents, my analysis –

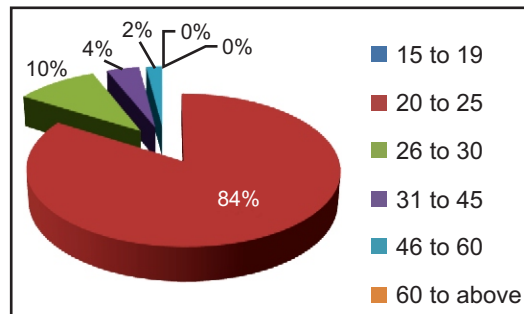
1. Gender-

- Male
- Female
- LBGTQ



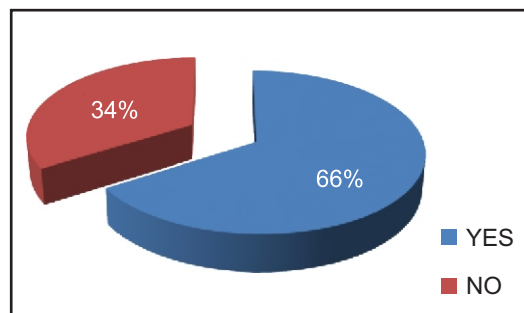
2. Age-

- 15 to 19
- 20 to 25
- 26 to 30
- 31 to 45
- 46 to 60
- 60 to above



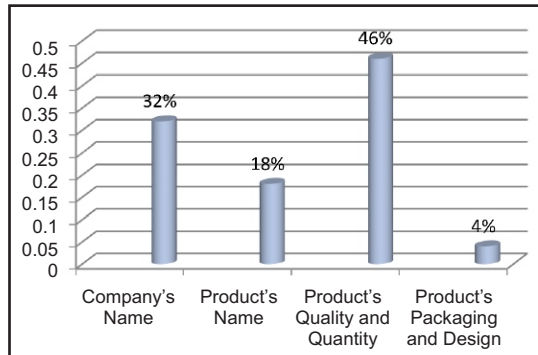
3. Are you a brand conscious type of person?

- Yes
- No



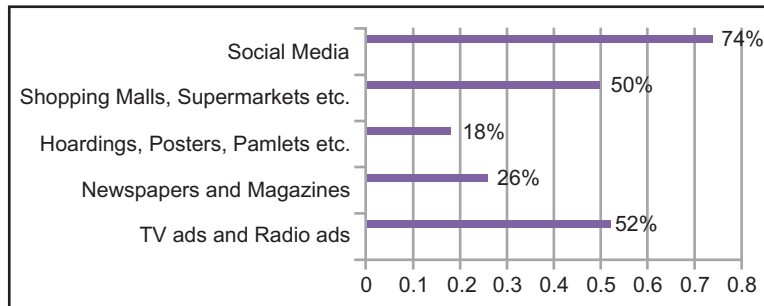
4. How do you remember a brand or a product?

- Company's name
- Product's name
- Product's quality and quality
- Product's packaging and design



5. Did you come to know about those branded products?

- TV ads and Radio ads
- Shopping Malls, Supermarkets etc.
- Newspaper and Magazines
- Social Media
- Hoardings, Posters, Pamphlets etc.

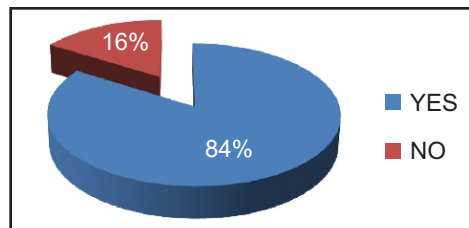


6. What is that one brand or product that is imprinted in your mind?

Adidas(2), Apple(1), Biba(1), Biotique(1), Body Shop(1), Elle 18(1), Forever 21(1), Ginger(1), Global Desi(1), Gucci(2), ITC(1), Jockey(1), Johnson & Johnson(1), Lakme(2), Levis(2), L'oreal(2), Maggi(3), Mango(1), Nevia(1), Nike(2), P&G(1), Pepsodent(1), Puma(1), Rado(1), Realme(1), Renault(1), Samsung(3), Surf Excel(1), Tata tea(1), Tiffany(1), Timex(1), United Colors of Benetton(1), Westside(1), Zara(5)

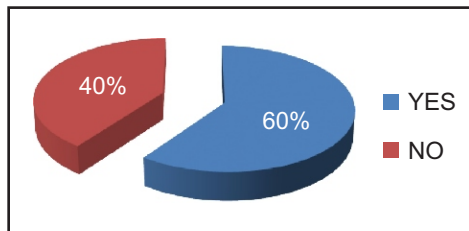
7. Do you consider price of the brand or product while purchasing it?

- Yes
- No



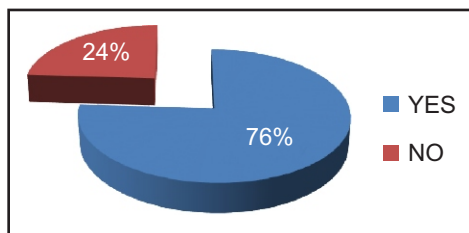
8. Do you remember any advertisement of a relaunched product?

- Yes
- No



9. Have you ever used a relaunched product?

- Yes
- No

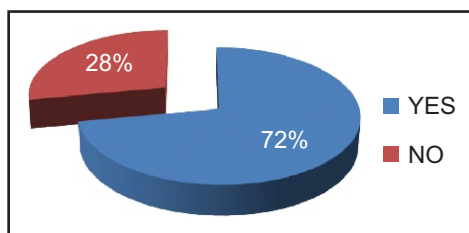


10. If Yes, then please mention it. (Not a compulsory question)

Hutch relaunched and became Vodafone, Hyundai i10, Kurkure, Maggi, Old Spice, Coca Cola.

11. If you are loyal to a particular brand or product would you use its substitute, if not available in the market or prices of that product has increased?

- Yes
- No



Conclusion

To survive in the market, a company has to do a lot of hard work. They need to make sure that their brand or product has a mark in their customer's mind. Only advertising about the brand or product is not enough, it has to live in the minds of the customer and stay alive for as long as possible. The product has to be so impressive that it has to go beyond what a customer expects. For which company advertises about the product, provide free samples, etc.

As depicted from the report every customer likes branded products but everything depends on their affordability. As branded products assures good quality which is an important factor after pricing

of the product for purchasing that product. Customer would go for it only if it fits their pocket. There are situations where customers would go for another substitute incase their particular product is missing from the shop shelf.

Advertising of the product is important and in today's world there are various ways through which a company can reach its customer. The social media is the most effective as it is easily available to most of the customers.

Making space in customer's mind is the most important as that assures survival of the product. If the customer remembers the product, that product has made space in customer mind. Attractive ads, posters etc. are constant reminder of product to the customers.

There are several products that are relaunched with new identity, different features, etc. But whether customers have used those relaunched product or not is a big question. Whether customers accept those product or not.

Hence, with respect to my analysis made it can be concluded that branding does play an important role in retaining the customers by the company. There are times when it is necessary for a product to relaunch itself due to its declining demand in the market. In such a case if product gets a comeback in the market and it is doing a superb work with new identity. This would revive the product and it would run in the market again.

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