

# Social and Economic Needs and Contributions of the Citrus Industry in Nueva Vizcaya, Philippines

Marjorie B. Ramel, Ph.D.

Assistant Professor I, Nueva Vizcaya state University, 3700 Bayombong, Nueva Vizcaya, Philippines

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**Abstract**— *Using mixed methods, this study profiled the key actors of the citrus industry and ascertained the industry's social and economic needs and contributions in Nueva Vizcaya. Findings revealed that the citrus actors' work classification is diverse. They comprised plantation owners, farmers and traders who have sufficient years of experience in the industry. The top-most distributed products consist of Satsuma, Ponkan and Szinkom oranges. They distribute the citrus products in the province and in other regions but very few of them export abroad. On social needs, most informants desire to sustain their literacy and training as it is a way to enhance their knowledge and competencies. The distribution of personal protective gears, medicine aids, hospitalization benefit and regular safety inspection make them more secure and safe. Accordingly, the industry has a socializing effect since it offers them and family members employment opportunities and creates in them greater social value in performing their functions. Along economic needs, the key players are optimistic about current public utilities but are still in need of internet service, sanitation for safety purposes, regular waste management, sanitation, environment-friendly and sustainable farming, withholding and filing of their taxes, purchase of health and safety materials, investment on juice processing, fertilizers and pesticides, as well as making accessible the trade centers, creating more spacious trade centers, more fruit stalls and processing centers as these could help sustain the industry. Most participants claimed that the industry has helped them economically in the form of stable incomes, additional source of income, a non-hazardous work environment and health benefits. The identified gaps were varied and multifarious. They emanated from the research participants' work-related demographics and social and economic needs.*

**Keywords**— *Business canvas model, human investment, material and financial resources, value chain theory; citrus industry*

## I. INTRODUCTION

Citrus fruits are expended globally as it is eaten by all peoples of the world no matter the race, religion or ethnic affiliation. Still, production is focused in a few nations with the United States, Brazil and China leading the world's producers (Jegade, 2019; Zhang, 2019). In the international citrus industry, several studies affirm that citrus is a major contributor to the economic value of the agricultural sector. The paper from Babcock UC Riverside (2017) in California, United States, noted that lemons, oranges, grapefruit, and mandarin, accounted for at least 2.4% of total crop acres in the state and generated 6.8% of total crop revenue in 2016-2017. This industry generated about 11.5 billion in dollars

revenue in citrus exported globally in 2017. It is no wonder that California is dubbed the Citrus Capital of the World.

This study supports the paper of Ashraf (2020), conducted in Punjab, Pakistan wherein the author considered citrus to be one of the leading fruits in Pakistan. The citrus industry is recognized to be duly important in contributing to the national economy and to the farmers' livelihood. In the said study, citrus growers made cultivars of Kinnow, and with this, Pakistan is acknowledged as having a unique taste, extended quality, size, and extensive demand of Kinnow across the world. Their citrus supply chain includes a variety of intermediaries who play an important role in marketing. Processors, middlemen, and friends/neighbors are among the most common

intermediaries to whom growers sell pre-harvest fruits. Growers sell pre-harvest fruit to factories, retailers, and middlemen more frequently, yet they are subjected to monopolies and low returns.

The various activities in the development of citrus almost always follow the subsequent phases such as: (a) site choice; (b) cleaning nursery stocks; (c) variety selection; (d) planting; (e) orchard monitoring till pre-harvest; (f) harvesting; (g) differentiating sizes; (h) packing; (i) distribution. In site choice, good drainage, suitable soil and water accessibility all make the citrus plant robust. It is followed by preparation and cleaning of citrus stocks in a nursery. A good variety of citrus selection is stored ready for planting. When everything is considered, planting starts. It is then monitored and this includes application of fertilizers and pesticides. The monitoring phase is until pre-harvest. Then when the citrus fruits are ready, they are harvested and classified according to sizes. When everything is harvested, farmers start to pack and distribution to traders or markets ensue. This cycle is repeated (Australian Department of Primary Industries and Regional Development, 2020).

In the Philippine context, a lot of studies on local citrus industry proved that the citrus industry is a booming business. Citrus fruits have high demands in the domestic market and area expansion for its cultivation is notably fast, making citrus fourth among national priority crops. Libunao (2003) and Antonio (2011) for instance, studied the profitability of Citrus farming in Kasibu, Nueva Vizcaya. Accordingly, citrus is considered a high-value commercial crop, and the government has taken steps to enhance and improve the productivity of the industry in the country. These studies mention that the citrus industry has been a significant contributor to the local economic growth and remains an important source of employment for more than 20 years now. Among the most profitable varieties identified in these studies are that of *Satsuma* (Mandarin) and *Ponkan* (Orange), resulting to increased entry of farmers and traders in the citrus industry.

A region in the Cagayan Valley is the province of Nueva Vizcaya, known for its tropical monsoon climate ideal to agriculture and citrus production. It is bounded on the west by the Cordillera mountains, on the east by the Sierra Madre mountains, and on the south by the Caraballo Mountains. It is surrounded by three of the largest mountain ranges of Luzon – with differential steepness, rolling hills with verdant valleys and plains. It has an average annual temperature of 25° degrees and an ample rain of about 1,591 mm of rain annually. It is dry during summer, from June to July and rainy from August to December. During December and January to mid of February months, a cooler

temperature prevails. Such climate, weather temperature and abundant waters make it ideal for the cultivation of citrus.

Dubbed as the Citrus Capital of the Philippines, the Cagayan Valley Region (R2) is positioning itself as the main producer of citrus. The Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development of the Department of Science and Technology (DoST-PCAARRD) and the Nueva Vizcaya State University entered into a Memorandum of Agreement to increase the domestic supply of citrus, which is currently insufficient to meet consumer demand. Decrease in production due to high incidence of pests and diseases, poor orchard supervision and minimal adoption of improved management practices continue to challenge the industry. The Nueva Vizcaya State University's research and development aims to yield improvement by setting up gene bank and value chain analysis. It is aiming to increase yield from 4.5 tons per hectare to 15 tons per hectare. By 2017, the team was projected to have produced value chain maps for calamansi, orange, and pomelo in the Cagayan Valley.

Some highlights of accomplishment of the citrus industry in the province include a production of an initial map of market channels and pricing for pomelo in Nueva Vizcaya and calamansi in Cagayan after surveying growers and traders. There is also an index of 151 citrus mother trees from the Nueva Vizcaya State University and 11 from private orchards for citrus tristeza virus (CTV) and huanglongbing (HLB) or citrus greening disease. At the end of 2017, the team had produced value chain maps for calamansi, orange, and pomelo in Cagayan Valley. Among the citrus fruits produced, traded and or processed were: Washington Navels, Red Chandler Pomelo, Chinese Pomelo, Siamese Pomelo, Hamlin Orange and Innova Mandarin orange at 4.5% of the research participants.

In addition, the development of citrus industry over the years has improved the quality of life of the farmers, especially of Malabing Valley in the municipality of Kasibu, Nueva Vizcaya where citrus is grown abundantly, making Nueva Vizcaya the citrus capital in the region (The Philippine Star, 2018). For example, the support of the Philippine Rural Development Project (PRDP) on viable agri-based industries through a developmental framework which was focused on expanding market access and improving competitiveness of citrus farmers and traders helped a lot in the program's investment planning component. It utilized value chain analysis (VCA) as one of its science-based tools for developing provincial commodity investment plans (PCIP) especially for specific high impact agri-based enterprises serving as employment generators and providing income opportunities in the

countryside like the Malabing Valley citrus industry (DTI-PRDP Data, 2017).

In June of 2021, the Department Trade and Industry and the Regional Inclusive Innovative Center (RIIC) Program, also dubbed as Sustaining Harvest through Innovation and Nurturing Enterprise or SHINE Cagayan Valley, was successfully launched. The RIIC is envisioned as a convergence mechanism for delivering knowledge management products and business linkage services for micro, small, and medium enterprises (MSMEs); developing research-based production and value-adding solutions; and building replicable innovation models through pilot industry sectors initially on citrus and banana. The group is expected to lead the inclusive economic growth in the countryside, especially in Cagayan Valley (Region2). DTI undersecretary Rafaelita M. Aldaba expressed her strong support to the RIIC in the region looking at RIICs as innovation and collaboration spaces aimed to bridge the gap in the country's innovation and entrepreneurship ecosystem by serving as a virtual or physical platform that would link innovation stakeholders together with start-ups, MSMEs, and large companies by creating a venue where productive discussions and collaborations between government, academe, and industry would take place. As DTI-Region 2 Director enunciated in the launching of the RIICs:

A previous research in Kasibu conducted by Antonio, Madamba and Williams (2011) mentioned that citrus farming is a lucrative business. For some types of citrus, for example, Satsuma produces a net profit margin of 42.44% while orange and pomelo show net profit margins of 37.72% and 12.86%, respectively. Such profit data depend on wide-ranging factors of the citrus industry like the lands in Kasibu mostly obtained through inheritance and where citrus farms are already in existence ten years and above and where labor is minimal since it is a family business. Moreover, as the fruits also differ according to seasons and weather conditions, the profit nets vary. Thus, a particular farmer needs to cultivate varieties of plants to compensate for the seasons where citrus nets are low. The citrus industry thus, is a promising source of steady income among growers and there are still vast tracks of lands awaiting cultivation.

However, the citrus industry in Nueva Vizcaya also suffers from a lot of challenges. Doing sustainable farming is a challenge shared by the farmers. Some mentioned land loss due to soil erosion, climate change, pests and diseases, inappropriate use of fertilizers and pesticides resulting to undersized citrus fruits. There are also limited value-chain studies, inadequate infrastructure and facilities and knowledge and skills among citrus

farmers. Researchers thus, recommend sustained seminars and trainings to further develop farmers' knowledge and competencies. This is one of the gaps that this study aimed to accomplish. By crafting an all-inclusive social and economic need, the contributions of the citrus industry to people could be further enhanced and promoted.

Albeit some activities that are already in place, to entice people to indulge in citrus cultivation, local government units are launching many activities such as through PCAARRD's FIESTA as a venue for collaboration and partnership in the citrus industry, for investors to enhance the flow of technology and its utilization for greater economic benefit, the citrus R&D programs, projects, and initiatives in Cagayan Valley, exhibits for fresh citrus products and various products derived from citrus and investment forums (Zuraek, DOST-PCAARRD S&T Media Services, 2018). It also came up with innovated citrus varieties such as Szincom (Mandarin), Red Chandler (pomelo), Siamese (pomelo), Chinese (pomelo), Calamansi (Luz and Native), Magallanes (pomelo), Washington Navels (Orange) and Hamlin (Orange).

For many years, citrus continue to provide work opportunities for the people of the province and it has improved the quality of life among them. This is credited to the strides of the provincial and local governments, citrus growers and traders. The presence of cooperatives also helps in maximizing the potentials of the industry by processing citrus into finished products such as ciders, wines, and candies. State universities and private HighnEIs and the agricultural sector in the province are enjoined to conduct worthwhile and relevant researches on citrus to combat pests and diseases. Meanwhile, to give credence to this growing industry, activities are showcased during the provincial fiesta. These activities highlight citrus R&D programs, projects and citrus products, student activities promoting the industry through cooking contests, essay writing, poster making, quiz bee, investment forum and tourism promotion of citrus plantations.

In the mountainous terrains of the municipalities of Malabing, Kasibu, Diadi and Quezon, varieties of citrus like Satsuma, Ponkan, Red Chandler (Pomelo) and other varieties of citrus thrive in their rich soils and cool climate. Cooperatives in Nueva Vizcaya like the Malabing Valley Multipurpose Cooperative also contribute to the sustenance of the citrus industry. It is an agricultural-based cooperative involved in citrus and vegetable production, and is recognized as one of the major producers of citrus fruits in the province. It has more than 2,000 members and almost 500 of whom are citrus farmers – with some 500 hectares of total collective citrus orchard in Kasibu.

Some of the trainings and assistance provided by the DTI to the citrus industry include: investment marketing, enabling the investment environment and investment servicing, industry cluster enhancement program, cities and municipalities competitiveness index survey, Cagayan Valley competitiveness development agenda, resource generation, establishment of *negosyo* centers, market access and development, product development assistance, food development program, shared service facility, great women project, consumer education and advocacy program, monitoring and enforcement, Consumer welfare desk program and consumer and business education seminars and information drives are also in place (DTI, 2022).

Still, the citrus industry in Nueva Vizcaya is not without any glitches. In fact, some social actors during the interview and scanned documents from previous studies mentioned some challenges. These problems include: (a) insufficient knowledge and skills on citrus farming practices and low application of manure among citrus growers; (b) shortage of rainfall in some areas resulting to small shapes and yields; (c) lack of irrigation farming to water the plants/trees; (d) human capacity challenge in that according to the observation made, development activities should not be implemented if they do not improve the human capacity of small-scale farmers in rural areas. Without skills, small-scale farmers would be unable to apply new knowledge to improve citrus fruits production and incomes; (e) limited working capital for traders and growers. Many farmers fail to sell their oranges to the distant and lucrative markets; (f) poor citrus fruit quality brought about by pests and diseases; (g) lack of high value additional activities for growers and farmers; and (h) minimal processing plants. Distance sometimes pose a challenge since the processing factories are located far from the plantation. Obviously, when growers and farmers add value to their citrus, such product stand a higher chance of getting a much higher selling price.

How far will the advantages of citrus production last or outweigh the setbacks? This was a major question that bugged citrus owners, workers and traders. Antonio (2011) and Belen (2017) disclosed that a major challenge in the industry is the declining domestic supply, which is insufficient to meet local demand. This is brought about by high incidence of pest and diseases due to the huanglongbing (HLB) or greening disease, poor orchard management, and low adoption of improved management practices. Among other factors is a high degree of competition among traders.

This is the premise upon which this study was conducted. Max Weber, a famous German Philosopher

noted, “Socio-economic problems do not exist everywhere in that an economic event plays a role as cause or effect.” This is so since problems arise only where the significance of those factors is problematic and can be precisely determined only through the application of methods of social economics. The foregoing ideas have piqued the interest of the proponent of this paper - enough to spur the application of the method of socio-economics in the study of the socio-economic contribution of the citrus industry in the province of Nueva Vizcaya.

This study was patterned on two models such as the Value Chain Model by Michael Porter and the Business Canvas Model by Alexander Cowan in order to realize its intentions. In Porter’s Value Chain Model, there is a need to understand and identify sub-activities for each primary activity like direct, indirect and quality assurance activities. Direct activities are those that create value by themselves like in this study, how to market the citrus product and how sales could be improved. Meanwhile, indirect activities pertain to activities that allow for the citrus industry to run smoothly such as planning for marketing schemes, managing the sales of citrus and or managing the sales staff or making consumer records. Lastly, quality assurance are activities that ensure that direct and indirect activities are met and with high standards (Van Vliet, V., 2010).

### Statement of Objectives

Given the foregoing theoretical, conceptual and analytical frameworks of this study, it was the intention of this paper to explore the social and economic needs of the actors in the citrus industry of Nueva Vizcaya, as well as the citrus industry’s social and economic contributions. It specifically sought to fulfill the following goals:

1. Describe the work-related demographics of key actors of the citrus industry in the province of Nueva Vizcaya in terms of the following:
  - 1.1 work classification;
  - 1.2 number of years in the citrus industry;
  - 1.3 citrus varieties farmed, traded or processed; and
  - 1.4 main distribution areas.
2. Ascertain the social needs and contributions of the citrus industry in Nueva Vizcaya in terms of:
  - 2.1 literacy and training;
  - 2.2 family and social support; and
  - 2.3 health and safety.
3. Ascertain the economic needs and contribution of the citrus industry in Nueva Vizcaya along:
  - 2.1 public utilities;
  - 2.2 public infrastructure;
  - 2.3 sustainable environment;

- 2.4 taxes;
  - 2.5 investments; and
  - 2.6 innovations.
4. Identify the gaps on the social and economic needs and contributions of Citrus Industry in the province of Nueva Vizcaya;
  5. Propose an inclusive social and economic assistance plan for the citrus industry in the province of Nueva Vizcaya.

## II. METHODOLOGY

### Research Design

The study utilized the mixed methods research approach. It required a purposeful mixing of quantitative and qualitative data collection, data analysis and interpretation of the evidence to enable a more purposeful and descriptive panoramic view of the social and economic needs and contributions of the citrus industry in the province of Nueva Vizcaya.

### Research Environment

This study was conducted in Bayombong, Nueva Vizcaya where the Nueva Vizcaya State University (NVSU) is located including the municipality of Kasibu, Nueva Vizcaya and Nueva Vizcaya Agricultural Terminal, Inc. (NVAT) in Bambang, Nueva Vizcaya in as much as it was where most key informants or citrus growers and cooperatives are mostly based. Kasibu is a 3rd class municipality in the province of Nueva Vizcaya, Philippines. According to the 2015 census, it has a population of 37,705 people. It is said to be the citrus capital of Region 2.

NVSU was also used as a locale because this is where the manager of the Processing Center and selected research faculty and employees of the processing center at the University are based. NVSU is a public university in the Philippines which is mandated to provide advanced instruction and professional training in agriculture, arts, science, technology, education, and other related fields.

## III. RESULTS AND DISCUSSION

### 1. Work-related Demographics

Results relative to some work-related demographics of the research participants, findings revealed that most plantation owners who indulge in the citrus industry citrus have sufficient years of experience with the business with about ten to 32 years of experience. Among the top-most distributed products are Satsuma orange, Ponkan, Calamansi and Szinkom orange. All of them

distributed the citrus products in the municipalities of Nueva Vizcaya and a big majority also sold their products to consumers in the Cagayan Valley Region, Cordillera Administrative Region, Central Luzon and the National Capital Region. The literacy rate is more than 90% in the citrus growers, having at least five years of schooling and only 3.2% respondents are illiterate. Traders are either small, medium and large sized contractors who may either be wholesalers or retailers.

### 2. Social Needs and Contributions of the Citrus Industry in Nueva Vizcaya in terms of Literacy and Training, Family and Social Support and Health and Safety

The economist, Buijs, (2020) defines social needs refer to those needs on social processes and economic activity within a society. These social needs are identified under social factors such as income, education, employment, community health and safety, and social supports can significantly affect how well and how long we live. Social needs include sustainable income, employment, education, food security, housing, transportation and social support from family, friends and colleagues in the workplace, etc. (Buijs, 2020). Thus, relative to this study, social needs pertain to the industry's capacity to fulfill the key actors' social needs in their engagement in the citrus industry, which is contributory to their feeling of effective functioning in society and fulfillment of wellbeing through three domains namely: (a) literacy and training; (b) family and social support; and (c) health and safety.

Meanwhile, social contributions, in this study, pertain to the industry's social influence or impact in terms of its socializing effect in the participants' lives where opportunities to excel and the fulfillment of their functions as farmers or traders and or product processors in the industry provide them with a higher sense of social worth and well-being.

#### A. Literacy and Training

In ascertaining the social needs of the citrus industry in Nueva Vizcaya specifically among actors, the interview responses were openly coded and then thematically clustered to surface patterns in the research participants' experiences. These clustered themes are shown in tables for easy visualization and understanding.

Table 1 shows various themes on social needs that are considered the immediate needs of the research participants in order to feel the social value of the industry more and create greater opportunities for them in their effective functioning in the community.

Table 1. Themes on Social Needs along Literacy and Training

Identified Social Needs	Type	Frequency (N=22)	Percent
The need to enhance further their knowledge and skills in the citrus industry	Further education and trainings such as on practical technologies, advertising, packaging and marketing	22	100
More trainings on processing and modern marketing schemes	Sustained training workshops on citrus processing and marketing techniques	20	90.9
<b>Other Social Needs:</b>	Further education in doing promotional techniques	10	45.5
	Use of personal protective equipment and power sprayers	6	27.3

N=22 (\*Multiple Response)

It is evident that in terms of literacy and training, 100% of the participants want to enhance their knowledge and skills further in the citrus industry through trainings such as on using practical technologies, advertising, packaging and marketing. About 90.9% want sustained training workshops on citrus processing and in using modern marketing schemes to increase profit. About 45.5% of them view other social needs like further education in

doing promotional techniques and 27.3% mention the need to use personal protective equipment to protect themselves against harmful exposure to chemical fertilizers and in using power sprayer to minimize hard labor.

**B. Family and Social Support**

Table 2 shows some relevant social needs shared by the participants along family and social support:

Table 2. Themes on Social Needs along Family and Social Support

Social Needs Along Family and Social Support	Frequency	Percent
Need for greater opportunity to other family members to get employed in the citrus industry	10	45.5
Need for fulltime employment in the industry	8	36.4
Need to attract other people to work in the industry	12	54.5

N=22 (\*Multiple Response)

Results of the survey yielded the following information on perceived social needs along family and social support. About 45.5% of the informants mentioned the need for greater opportunity of family members to get employed in the citrus industry. Around 36.4% shared a need for fulltime employment in the industry rather than being a seasonal worker. Lastly, 54.5% of the participants mentioned about the need to attract other people or family members to work in the industry.

employer, the workers have more responsibilities and there is increased loyalty because of the additional benefits. For seasonal or part time workers, there is lesser flexibility and greater work burnout since there is no benefit at all or fewer benefits. In addition, offering jobs to unemployed family members means additional income for the family and attracting other people to work in the industry presupposes additional human resource and greater income for employers.

The results could mean that the research participants view the importance of giving greater opportunities for other members of their families to be employed in the industry and the need to attract jobless people to seek employment in the industry. They also yearn to get full time employment rather than being a seasonal worker. They believe that fulltime workers have better benefits like having health insurance, work eight hours and therefore have higher take home pay. On the part of the

Based on the data collected, two major themes emerged. About 45.5% of the participants mentioned that the industry has provided them jobs and around 40.1% said it has provided other members of their family some additional sources of income. The socializing effect of the citrus industry is therefore apparent, most especially for farmers and traders whose family members were given additional sources of income either in tilling the land,

planting, spraying fertilizers, harvesting or even in packaging works.

Meanwhile, in terms of LGU support and regional and national agency assistance, Table 4 shows that at least 68.1% of the research participants have availed of assistance and support from the municipal, provincial, regional and national levels. Some aids were sponsored by the LGU and others are sponsored by the PLGU. Meanwhile, since all

Table 3. Types of Assistance Availed from Governmental Agencies

Themes on Types of Governmental Assistance Availed	Frequency (N=22)	Percent
Financial Assistance (Start-up Capital)	15	68.1
Fertilizer donations	17	77.2
Processing facility	18	81.8
Processing equipment	18	81.8
Externally-funded Project	4	18.1

N=22 (\*Multiple Response)

It is evident that about 68.1% received financial assistance, 77.2% received fertilizer donation, 81.8% each have been assisted with processing facility, including needed equipment respectively, while 18.1% were granted external funds for citrus projects.

Externally-funded projects refer to those financial assistance or funds obtained from governmental agencies such as the Department of Trade and Industry and the Department of Agriculture like start-up capitals for beginning entrepreneurs, pilot citrus projects, drip irrigation

Table 4. Availed LGU Support and Regional and National Agency Assistance

Assistance and Support Availed	Frequency (N=22)	Percent
Municipal Level	15	68.1
Provincial Level	15	68.1
Regional Level/National	15	68.1
Did not avail of anything from any level	7	31.8

N=22 (\*Multiple Response)

Some regular worker who were classified as farmer and trader had employed some of their family members and other farmers in their citrus fields. Meanwhile, many seasonal workers were hired during clearing and cleaning, planting, tending, harvesting and trading.

For investment and promotion, projects included investment marketing, investment servicing and the crafting

regional offices are attached to national agencies, they were clustered into one. However, some 31.8% of the research participants are not able to receive assistance.

Meanwhile, during the interview, when asked to respond to what type of donations do governmental agencies provide to the citrus industry, the following themes were surfaced as can be gleaned from Table 3:

and farm inputs to support plantation owners in projected sites like the Malabing Valley citrus plantations.

Again, the foregoing results could mean that the citrus industry has a socializing effect or contributions in terms of employment opportunities for the families and relatives of the workers. It helps them cope with challenges of life, especially with financial constraints, farm and processing inputs such as start-up capital, materials, fertilizers and processing facilities and equipment.

of the Cagayan Valley Competitiveness Development Agenda. For industry development, projects included industry cluster enhancement and resource generation. On SME development, projects included the Negosyo Center where registration of business, business advisory services, business information and advocacy and monitoring and evaluation are given emphases. On market access and development, projects included trade fairs, One Town, One Product (OTOP), product development assistance, food

development, shared service facility, the Mentor Me project and the Pondo sa Pagbabago (Start-up Capital) project. For consumer protection, projects included DTI Bagwis, consumer education and advocacy, business education and advocacy, Diskwento Caravan, DTI e-Presyo “Your Gabay When You Buy, DTI-R02 Consumer Welfare and Protection, Honest Market, Consumer-friendly Market and Fair-Trade Law (FTL) compliant market.

In these projects, many beneficiaries were helped and capacitated such as business enterprises, agri-business sector, traders, LGUs and other investment promotion stakeholders, e-commerce, tourism stakeholders, farmers, traders, regional line agencies, NGOs, farmers, suppliers,

traders, buyers, SMEs, business enterprises, PLGUs, small scale businesses, beginning entrepreneurs, consumers, wholesalers and retailers.

**C. Health and Safety**

The same technique was used in ascertaining the social needs and contributions of the citrus industry to growers, farmers and traders along health and safety. The interview responses were openly coded and then thematically clustered to create patterns in the participants’ experiences. These themes are presented in tables for easy visualization.

Table 5 shows the felt social needs of the research participants along health and safety:

Table 5. Social Needs along Health and Safety

Health and Safety Contributions	Frequency (N=22)	Percent
Need for greater health benefits	16	72.7
Need for medicine aid	21	95.4
Need for regular safety inspection routine	22	100.0

N=22 (\*Multiple Response)

As evident from the table, the research participants clamor for greater health benefits in that about 72.7% of them mention health benefits like hospitalization, while a big 95.4% want to receive medicine aid. Some farmers want to become full time workers because of the benefits received such as PhilHealth and the Social Security System (SSS) membership.

In addition, 100% of the research participants want to be more secure in the farms through routine safety inspections. This is necessary to keep the plantations healthy and safe as well as the health and safety of citrus growers and farmers. Safety inspections are also provided to sellers and or traders when the citrus fruits are already in stalls and or in stored cases ready for trading.

From the foregoing results, one could infer that despite the social needs identified, indeed, the citrus industry in the province has provided the workers with positive contributions and opportunities along health and safety.

**3. Economic Needs and Contribution of the Citrus Industry in Nueva Vizcaya along Public Utilities, Infrastructure, Sustainable Environment, Taxes, Investments and Innovations**

In this study, *economic contributions* refer to how the citrus industry is able to contribute to the fulfillment of the economic needs of the social actors in this study.

**A. Public Utilities**

Our understanding of public utilities are those provisions for certain types of services accorded to the public, in this case, for the citrus industry to bloom and prosper. These include transportation, water pipelines, sanitation, communication system, electricity, etc. In most cases, many of these are government-owned or government-operated.

During the interview, when asked about what types of public utilities are needed in the citrus farms, the responses are reflected in major themes shown in Table 6.

In terms of presence of public utilities, 100% of the informants mentioned that there is a need for utilities that support the citrus industry such as constant supply of water, electricity and transport system. Meanwhile, 36.3% said there must be telephone lines, while 81.8% stated that there should also be an in-place sanitation system.



Table 6. Needs on Public Utilities to Support the Citrus Industry

Needs on Public Utilities	Frequency	Percent
The need for constant supply of water	22	100.0
The need for electricity	22	100.0
The need for telephone lines/service	8	36.3
The need for a transportation system	22	100.0
The need to for sanitation	18	81.8

N=22 (\*Multiple Response)

**B. Public Infrastructure**

Public infrastructure pertains to those physical facilities, systems and structures that are created, maintained and developed which are mostly government-owned and operated for the general public. In this study, it refers to those physical structures and systems that are provided to support the citrus industry such as transportation infrastructure like bridges, roads, transport or water infrastructure such as water supply or water resource

management. Other infrastructures include educational infrastructure, telecommunication such as telephone network or landline, internet services, political structure such as regulatory bodies, and recreational infrastructure like natural reserves preservation, parks, historical sites and agro-tourism parks.

During the interview, when asked what types of public infrastructure are needed in the citrus farms, the key informants identified some which are reflected in Table 7:

Table 7. Needs on Public Infrastructure to Support the Citrus Industry

Needs on Public Infrastructure	Frequency	Percent
Need for more water infrastructure	21	95.4
Need for Farm to Market roads	21	95.4
Need for continuous supply of Power	20	90.9
Building New Trade Centers	3	13.6
Renovating Old Trading Centers	3	13.6
Building business stalls	2	9.0

N=22 (\*Multiple Response)

**C. Sustainable Environment**

In its simplest definition, a sustainable environment is described as an environment that is able to sustain itself by and through the help of people, organizations and agencies who protect, conserve and promote it. These organizations and individuals are then called to conserve the natural resources to protect the ecosystem in support of the health and wellbeing of future generations. In this study, creating a sustainable environment refers to practices that promote the ecosystem

through the use of indigenous farming techniques, organic farming, use of animal manure, and ecofriendly fertilizers. Sustainability in agriculture includes crop rotation, crop cover, and smart water usage, while sustainability in forestry involves selective logging and forest management.

During the interview, when asked what types of needs on sustainable environment do the informants want to promote, they forwarded responses reflected in themes on Table 8:

Table 8. Needs on Types of Sustainable Environment Practices to Support the Citrus Farms

Needs on Types of Sustainable Environment Practices in the citrus farms	Frequency	Percent
Need to sustain indigenous farming	17	77.2
Need for organic farming	11	50.0
Need for solar irrigation/renewable energy use	11	50.0
Need to practice drip irrigation	15	68.1

Need to practice crop rotation	15	68.1
Need to practice crop diversity	16	72.7
Need to perform cover crops	10	45.4
Need to use organic fertilizer	16	72.7

N=22 (\*Multiple Response)

#### D. Taxes

Taxes refer to the imposition of obligatory levies on individuals or things by government entities. Almost all countries of the world levy tax principally to raise revenue for government outflows, but they serve other purposes as well. Thus, in this study, it pertains to a financial charge imposed on a tax payer working permanently and or trading for income and or managing the business of a citrus farm.

In the Philippines, the following are the recognized types of employment: (1) regular; (2) casual; (3) project; (4)

seasonal; (5) fixed-term; and (6) probationary. In the citrus industry, there are producers and at the same time regular workers and seasonal workers. The seasonal workers are those that are called only when the need arises, while the regular are full time workers who receive a monthly salary and collected income taxes annually (Philippine Labor Code, 2020).

During the interview, when asked if the informants are paying obligatory taxes, they responded accordingly as reflected in themes presented on Table 9.

Table 9. Needs on Filing of Taxes by Citrus Actors

Needs on Filing Taxes	Frequency	Percent
Need for regular filing of Annual Income Taxes (Withholding and filing of Tax) for regular citrus workers	22	100.0
Need for regular filing of taxes for regular staff of the MVMPC	22	100.0

N=22 (\*Multiple Response)

#### E. Investments

Investments pertain to savings or reserves, usually in the form of items, properties or businesses acquired with the end goal of generating income or appreciation. Appreciation refers to an increase in the value of an asset overtime. For example, when a person purchases a good as an investment, the goal is not to consume the good but to create wealth or accumulate income in that the investor hopes for a greater return in the future from what was

originally invested. However, in this study, investments pertain to the citrus growers, farmers and traders' personal investments that are not monetary in nature but in the form of human capital such as knowledge and skills, trainings and seminars and health and safety investments.

During the interview when asked which type/s of investments do the citrus industry provided them throughout the course of their stay in the business, the key informants forwarded responses as gleaned from Table 10.

Table 10. Needs on Type/s of Investments in the Citrus Industry

Needs on Type/s of Investments	Frequency	Percent
Need for greater human capital (hiring of workers)	22	100.0
Need for enhancing knowledge and skills	22	100.0
Need for more trainings and seminars	22	100.0
Need for more equipment / machines	22	100.0
<b>Others:</b>		
Need investment on juice processing	12	9.0
Need investment on natural / organic	12	9.0

N=22 (\*Multiple Response)

**F. Innovations**

Innovation refers to the process by which an individual, groups or organization make creative and innovative new products, processes and or ideas. Thus, it is a creative approach to existing products making them new or processes or ideas that are done in new ways. In this

study, innovations refer to creative ideas and processes in the citrus industry.

During the interview, when asked what types of innovations are being made by citrus growers in Nueva Vizcaya, the respondents answered with the themes shown on Table 11.

*Table 11. Needs on Types of Innovations in the Citrus Industry*

Needs on Type/s of Innovations	Frequency	Percent
Purchasing modern farm equipment/materials (Power Spray)	6	27.2
Building for packaging	8	36.3
Processing citrus into new products	18	81.8
Building Processing facility	9	40.9
Product quality and branding	15	68.1
Service quality and service improvement	12	54.5
Utilizing new business models	8	36.3
Widening distribution channels	11	50.0
Creating networking and linkages	11	50.0

**N=22 (\*Multiple Response)**

**IV. CONCLUSIONS AND RECOMMENDATIONS**

The findings in this paper enabled the researcher to make the following conclusions:

**1. Work-related Demographics**

The work classification of research participants is diverse. They comprise plantation owners, farmers and traders. Most citrus farms are located in the municipality of Kasibu, Nueva Vizcaya because of its cool weather ideal for citrus farming. They have sufficient years of experience in the citrus industry either in citrus production and or marketing. The top-most distributed products consist of Satsuma orange, Ponkan, Calamansi and Szinkom orange. All of them distribute the citrus products in the municipalities of Nueva Vizcaya and a big majority also sell their products to consumers in the Cagayan Valley Region, CAR, Central Luzon and the NCR. Very few of them are into exportation.

**2. Social Needs and Social Contributions of the Citrus Industry**

On literacy and trainings, most informants express the desire to sustain their literacy and training as it is a way to enhance their knowledge and competencies. They see the importance of motivational schemes among sponsors to entice other citrus growers, farmers and traders to attend such capacitation activities. On family and social support, the citrus industry has a socializing effect since employment opportunities for their family members is a big option. It

also helps them to cope with life’s challenges, especially with some financial constraints, farm and processing inputs such as start-up capital, needed materials, fertilizers and processing facilities and equipment. On health and safety, distribution of personal protective gears, medicine aid, hospitalization benefit and regular safety inspection help them become more secure and at peace in the citrus farms. The socializing impact of the citrus industry create in them a social value and self-worth in that they have the opportunities to excel and fulfill their functions as farmers or traders in the industry which provide them with a higher sense of social worth and wellbeing.

**3. Economic Needs and Economic Contributions of the Citrus Industry**

On public utilities such as water, electricity, transportation system and sanitation, the plantation owners, farmers and traders are optimistic about the public utilities being offered at the moment, however, they are still in need of internet service and sanitation for safety purposes. On public infrastructure, the citrus actors express the desire to improve other needed infrastructure such as telecommunication, waste management and sanitation. On sustainable farming, the citrus actors express desire to improve on environment-friendly agricultural practices by sustaining training capacitations relating to sustainable farming and maximizing participation among citrus workers. On investments, the participants express the need

for more sustained knowledge and skills enhancement through trainings and seminars, purchase of health and safety materials, investment on juice processing and on fertilizers and pesticides. On innovations, the participants believe that there is still a big room for improvement especially on accessibility to trade centers, or the need to build new trade centers which should be strategically located around the province, more spacious trading centers, more fruit stalls and more processing centers. Most participants claim that the citrus industry is able to contribute to the economic needs of their families in the form of income, additional source of income for other family members, having a non-hazardous work environment, significant primary relationships between employers and employees and free medicine aid.

### Recommendations

In the light of the findings and conclusions derived from this study, the following recommendations are highly advanced:

1. More people and cooperatives are encouraged to engage in the citrus industry. All available means of communication and advertising should be considered to maximize earnings. Family members of citrus actors must be enticed to participate while governmental assistance and support are seen as important in capacitating the citrus plantation owners, farmers and traders. Other citrus varieties must be introduced and widening of market through linkages and organizational support are seen as beneficial. Exportation of quality citrus be encouraged not only in Asia but globally through the support of governmental and non-governmental institutions.
2. Literacy trainings must be sustained, and wider audience should be encouraged to participate. Employment in citrus farms be invigorated and family members of citrus workers must be offered regular jobs. Provisions for educational grant for citrus farming, start-up capital, needed materials, fertilizers and processing facilities and equipment be integrated in governmental and non-governmental assistance and support plans. Distribution of personal protective gears, medicine aid, hospitalization benefit and regular safety inspection be sustained. Internet services and sanitation be done for safety purposes and improvement of other needed infrastructure such as telecommunication(deleted), waste management and sanitation be regularly updated. Activities for sustainable farming should be conducted habitually. Withholding of taxes for regular workers be done. Provisions for

accessibility to trade centers, creation of new trade centers which are strategically located, more spacious trading centers, more fruit stalls, and more processing centers should be included in future governmental plans;

### REFERENCES

- [1] Abhinav, K., Collu, M., Benjamins, S., Cai, H., Hughes, A., Jiang, B., William, S., Lin, L., Liu, H. Recalde-Camacho, L., Serpetti, N., Sun, K., Wilson, B., Yue, H., & Zhou, B. (2020). Offshore multi-purpose platforms for a blue growth: A technological, environmental and socio-economic review. *Science of The Total Environment*, 734, 138256, ISSN 0048-9697, <https://doi.org/10.1016/j.scitotenv.2020.138256>.
- [2] Aguilar-Hernandez, G., Dias Rodrigues, J., Tukker, A. (2021). Macroeconomic, social and environmental impacts of a circular economy up to 2050: A meta-analysis of prospective studies. *Journal of Cleaner Production*, 278, 123421, ISSN 0959-6526. <https://doi.org/10.1016/j.jclepro.2020.123421>.
- [3] Akohoue, F., Segnon, A., & Achigan-Dako, G. (2017). *Diversity in smallholders' citrus orchards and cultivation bottlenecks: Research avenues for improved production in Benin*. West Africa.
- [4] Albizzati, P., & Tonini, & Astrup, T. (2021). High-value products from food waste: An environmental and socio-economic assessment. *Science of The Total Environment*, 755 (1), 142466, ISSN 0048-9697
- [5] Anwar, N., M. Luqman, S. Nasir, M. Sabir, H.B. Ahmad and S. Ashraf. (2021). Impact of harvesting and marketing behavior of citrus growers on their socio-economic development: A case of district Sargodha. *Sarhad Journal of Agriculture*, 37 (4) 1167-1177. DOI <https://dx.doi.org/10.17582/journal.sja/2021/37.4.1167.1177>
- [6] Asencio, A., Serrano, M., García-Martínez, S. (2018). Organic acids, sugars, antioxidant activity, sensorial and other fruit characteristics of nine traditional Spanish citrus fruits. *Eur Food Res Technol*, 244, 1497–1508. <https://doi.org/10.1007/s00217-018-3064-x>
- [7] Ashraf, S., Saqib, R., Hassan, Z., Luqman, M., & Rehman, A. (2020). Analysis of intermediaries' influence in citrus supply chain in Pakistan. *Sarhad Journal of Agriculture*, 36 (1), 210-216. DOI <http://dx.doi.org/10.17582/journal.sja/2020/36.1.210.216>
- [8] Belen, M., Nguyen, M. (2002). *Cagayan Valley eyes "citrus capital of the Philippines."* DOST-PCAARRD S&T Media Services.
- [9] Beltrán-Esteve, M., Picazo-Tadeo, A., & Reig, E. (2012). What makes a citrus farmer go organic? Empirical evidence from Spanish citrus farming. *Spanish Journal of Agricultural Research*, 10 (4) 901-910. DOI.10.5424/sjar/2012104-2957
- [10] Blanc, S., Massaglia, S., Brun, F. Peano, C., Mosso, A., Giuggioli, N. (2019). Use of bio-based plastics in the fruit supply chain: An integrated approach to assess environmental, economic, and social sustainability. *Sustainability*, 11 (19) 2475. <https://doi.org/10.3390/su11092475>

- [11] Blanc, S., Accastello, C., Girgenti, V., Brun, F., & Mosso, A. (2018). Innovative strategies for the raspberry supply chain. *Environmental and Economic Assessment*, 19 (165), 23-30.
- [12] Casiro, R., & Catubig, E. (2019). Paper industries corporation of the Philippines (PICOP): Its history and socio-economic impact in Bislig City, Surigao Del Sur. *International Conference on Public Organization (ICONPO) 2019*, Available at SSRN: <https://ssrn.com/abstract=3515742> or <http://dx.doi.org/10.2139/ssrn.3515742>.
- [13] Court, C., Hodges, A., Stair, C., Rahmani, M. (2018). *Economic contributions of the Florida citrus industry in 2016-2017*. Sponsored project report to the Florida Department of Citrus.
- [14] Cowan, A. (Jan. 16, 2022). *The 20-minute business plan: Business model canvas made easy*. Retrieved from <https://www.alexandercowan.com/businessmodelcanvastemplates/?fbclid=IwAR31Bvzcdkn5jGBZI4evLGA6RXIOULLF7J1RVh7WjmFbdNGtF9cKR1dFZ8E>
- [15] Cuevas, R., Pede, V., McKinley, J., Velarde, O., & Demont, M. (2016) Rice grain quality and consumer preferences: A case study of two rural towns in the Philippines. *PLoS ONE* 11 (3): e0150345. <https://doi.org/10.1371/journal.pone.0150345>
- [16] Department of Primary Industries and Regional Development. (2020). *Citrus orchard management*. Australia. Retrieved from <https://www.agric.wa.gov.au/citrus/citrus-orchard-management>
- [17] Department of Trade and Industry - Philippine Rural Development Program (DTI-PRDP, 2017). *Consultative meeting held to jump start PRDP in Kasibu, Nueva Vizcaya*. Retrieved from <http://prdp.da.gov.ph/consultative-meeting-held-to-jump-start-prdp-in-kasibu-nueva-vizcaya/>
- [18] Department of Trade and Industry (June 20, 2021). *SHINE Cagayan Valley towards innovation and competitiveness*. Retrieved from <https://www.dti.gov.ph/regions/region-2/region-2-news/shine-cagayan-valley-innovation-competitiveness/>
- [19] DTI-Region II (February 1, 2022). *Summary of programs and projects from 2017-2021*. Retrieved from <https://www.dti.gov.ph/regions/region-2/programs-projects/>
- [20] Donkersley, P., Silva, F., & Carvalho, C. (2018). *Biological, environmental and socioeconomic threats to citrus lime production*. Retrieved from <https://doi.org/10.1007/s41348-018-0160-x>
- [21] Dorji, K., Lakey, L., & Chopel, S. (2016). Adoption of improved citrus orchard management practices: A micro study from Drujegang growers, Dagana, Bhutan. *Agric & Food Secur* 5, 3. <https://doi.org/10.1186/s40066-016-0050-z>
- [22] Duah, H., Segbefia, A., Adjaloo, M., & Fokuo, D. (2017). Income sustainability and poverty reduction among beekeeping value chain actors in the Berekum Municipality, Ghana. *International Journal of Development and Sustainability*, 6 (8), 667-684.
- [23] Galvan-Portillo, M., Sánchez, E., Cárdenas-Cárdenas, L., Karam, R., Claudio, L., Cruz, L., Burguete-García, A. (2018). Dietary patterns in Mexican children and adolescents: Characterization and relation with socioeconomic and home environment factors. *Appetite*, 121, 275-284. ISSN 0195-6663, <https://doi.org/10.1016/j.appet.2017.11.088>.
- [24] Gogo, T. (2021). *Effects of tree crop farming on socioeconomic status of farmers in Konshisha Local Government Area of Benue State, Nigeria*.
- [25] Gutierrez, R., Idago, R., Dela Cruz, R., & Rapusas, R. (2012). *Towards the improvement of the Malabing Valley Citrus Industry*. Nueva Vizcaya-The Citrus Capital of the Philippines, 2012. Retrieved from <https://www.pinoyadventurista.com/2012/06/citrus-capital-of-philippines.html>
- [26] Joseph, S., Rubhara, T., Antwi, M., & Oduniyi, O. (2020). Challenges to climate change adaptation practices among citrus farmers in Limpopo Province, South Africa. *International Journal of Climate Change: Impacts & Responses*, 12 (3), 19-32.
- [27] Kongai, H., Mangisoni, J., Ellepu, G., Chilembwe, E., & Makoka, D. (2018). Analysis of citrus value chain in Eastern Uganda. *African Crop Science Journal*, 26 (3), 417 – 431. ISSN 1021-9730/2018.
- [28] Lontakis, A., & Tzouramani, I. (2016). Economic sustainability of organic Aloe Vera farming in Greece under risk and uncertainty. *Sustainability*, 8 (16), 338. <https://doi.org/10.3390/su8040338>
- [29] Luckstead, J., & Devadoss, S. (2021). Trends and issues facing the citrus industry in the US. *CHOICES Magazine. Agricultural and Applied Economics Association*, 36, Quarter 2 of 2021. Retrieved from <https://www.choicesmagazine.org/choices-magazine/theme-articles/trends-and-challenges-in-fruit-and-tree-nut-sectors/trends-and-issues-facing-the-us-citrus-industry>
- [30] Makorere, R. (2015). An exploration of factors affecting development of citrus industry in Tanzania: Empirical evidence from Muheza District. *International Journal of Food and Agricultural Economics*, 2 (2), 135-154. ISSN 2147-8988/135.
- [31] Martin, M., Harris, S. (2018). Prospecting the sustainability implications of an emerging industrial symbiosis network. *Resources, Conservation and Recycling*, 138 (2018), 246-256. ISSN 0921-3449, <https://doi.org/10.1016/j.resconrec.2018.07.026>.
- [32] Majdalawi, M., Araj, S., Betiebit, S., Al-Assaf1, & Al Antary, T. (2020). Socio-economic analysis of using citrus peels to produce essential oils.
- [33] Musolino, D., Distaso, A., & Marciandò, C. (2020). The role of social farming in the socio-economic development of highly marginal regions: An investigation in Calabria. *Sustainability*, 12, 5285. <https://doi.org/10.3390/su12135285>.
- [34] Naseer, M., Ashfaq, M., Hassan, S., Abbas, A., Razaq, A., Mehdi, M., Ariyawardana, A., & Anwar, M. (2019). Critical issues at the upstream level in sustainable supply chain management of agri-food industries: Evidence from Pakistan's citrus industry. *Sustainability*, 11, 1326. <https://doi.org/10.3390/su11051326>
- [35] Neves, A., Godina, R., Azevedo, S., Matias, J. (2019). Current status, emerging challenges, and future prospects of

- industrial symbiosis in Portugal. *Sustainability*, 11, 5497. <https://doi.org/10.3390/su11195497>
- [36] Nawaz, R., Abbasi, N., Hafiz, I., Khalid, A., & Ahmad, T. (2018). Economic analysis of citrus (Kinnow mandarin) during on-year and off-year in the Punjab Province. *Pakistan. J Hortic*, 5, 250. Doi: 10.4172/2376-0354.1000250
- [37] Nicolo, B. De Luca, A., Stillitano, N., Falcone, G., Gulisano, G. (2017). *Environmental and economic sustainability assessment of navel oranges from the cultivation to the packing house according to environmental*.
- [38] Nomura, R., Ohata, J., Otsugu, M., Okawa, R., Naka, S., Matsumoto-Nakano, M., & Nakano, K. (2021). Inhibitory effects of flavedo, albedo, fruits, and leaves of Citrus unshiu extracts on Streptococcus mutans. *Archives of Oral Biology*, 124, 105056.
- [39] Nordhouse, W. (Dec. 3, 2021). *What does social and economic needs mean*. Retrieved from <https://lisbdnet.com/what-does-needs-mean-in-economics/>
- [40] Panwar, D., Saini, A., Parmjit, S., Panesar, H., & Chopra, K. (2021). Unraveling the scientific perspectives of citrus by-products utilization: Progress towards circular economy. *Trends in Food Science & Technology*, 111, 549-562, ISSN 0924-2244.
- [41] Passos, O., Souza, J., Bastos, D., Girardi, E., Gurgel, F., Vinícius, M., Garcia, B., Oliveira, R., & Filho, W. (2018). *Citrus industry in Brazil with emphasis on tropical areas, citrus - health benefits and production technology*. Muhammad Sajid and Amanullah, IntechOpen, DOI: 10.5772/intechopen.80213.
- [42] Potelwa, Y. (2020). *Socio-economic implication of citrus black spot on South African citrus exports to the European Union Market*.
- [43] Rehman, A., Zhang D., Hussain, I., Iqbal, M., & Jingdong, L. (2018). Prediction of major agricultural fruits production in Pakistan by using an econometric analysis and machine learning technique. *International Journal of Fruit Science*, 18 (4), 445-461, DOI: 10.1080/15538362.2018.1485536
- [44] Raimondo, M., Caracciolo, F., Cembalo, L., Chinnici, G., Pecorino, B., & D'Amico, M. (2018). Making virtue out of necessity: Managing the citrus waste supply chain for bioeconomy applications. *Sustainability*, 10. <https://doi.org/10.3390/su10124821>
- [45] Sarmiento, G. Enhancing the Mandarin industry of Malabing Valley, Nueva Vizcaya, Philippines. *International Journal of Management and Applied Science*, 2 (10) Special Issue-1, Oct.-2016. ISSN: 2394-7926.
- [46] Sharif, M., Ashraf, M., Mushtaq, N., Nawaz, H., Mustafa, M., Ahmad, F., Younas, M., & Javaid, A. (2018). Influence of varying levels of dried citrus pulp on nutrient intake, growth performance and economic efficiency in lambs. *Journal of Applied Animal Research*, 46 (1) 264-268. DOI: 10.1080/09712119.2017.1294540
- [47] Shi, Z., & Cao, E. (2020). Contract farming problems and games under yield uncertainty. *Australian Journal of Agricultural and Resource Economics*, 64 (4). Doi.10.1111/1467-8489.12400, 64, 4, (1210-1238).
- [48] Siddique, M., Garnevska, E., & Marr, N. (2018). Factors affecting marketing channel choice decisions of smallholder citrus growers. *Journal of Agribusiness in Developing and Emerging Economies*, 8 (3), 426-453. <https://doi.org/10.1108/JADEE-03-2016-0014>
- [49] Siddique, M. & Garnevska, E. (2018). *Citrus value chains: A survey of Pakistan industry*. Intech Open 2018. <http://dx.doi.org/10.5772/intechopen.7016151>
- [50] Strano, A., Falcone, G., Nicolò, B., Stillitano, T., De Luca, A., Nesci, F., & Gulisano, G. (2017). Eco-profiles and economic performances of a high-value fruit crop in southern Italy: a case study of Bergamot. *Agroecology and Sustainable Food Systems*, 41, (9-10), 1124-1145, DOI: 10.1080/21683565.2017.1357064
- [51] Suárez-Jacobo, A., Alcantar-Rosales, V. Alonso-Segura, D., Heras-Ramírez, M., Elizarragaz-De La Rosa, D., Lugo-Melchor, O., & Gaspar-Ramírez, O. (2017). Pesticide residues in orange fruit from orchards in Nuevo Leon State, Mexico. *Food Additives & Contaminants*, 10 (3), 192-199, DOI: 10.1080/19393210.2017.1315743
- [52] Taylor, R. (2017). Identifying publics in citrus producing states to address the issue of citrus greening. *Journal of Applied Communications*, 101 (3), 39-54.
- [53] The Citrus Industry in Jaffa. *Nature* 135, 614 (1935). <https://doi.org/10.1038/135614b0>. American Phytopathological Society (2020, March 18). New technique has potential to protect oranges from citrus greening. *ScienceDaily*.
- [54] Torres, J., Valera, D., Belmonte, L., Herrero-Sánchez, H. (2016). *Economic and social sustainability through organic agriculture: Study of the restructuring of the citrus sector in the "Bajo Andarax" District (Spain)*.
- [55] Ullah, R., Safi, Q. S., Ali, G., & Ullah, I. (2017). Who gets what? Citrus marketing in Bunir District of Pakistan. *Sarhad J. Agric.* 33 (3). 474-479. <https://doi.org/10.17582/journal.sja/2017/33.3.474.479>
- [56] Usman, M., Ashraf, I., Chaudhary, K.M., & Talib, U. (2018). Factors impeding citrus supply chain in Central Punjab, Pakistan. *Int. J. Agric. Ext.* 6 (1), 01-05. <https://doi.org/10.33687/ijae.006.01.2301>
- [57] Vaziritabar, S., & Esmaeilzade, S. (2017). *Profitability and socio-economic analysis of beekeeping and honey production in Karaj state, Iran*.