



PRISCILLA MBAMA ABASI

Making maps and flying drones to save lives

Position

GIS technician
Zipline

Education

MSc in geospatial and mapping science
University of Glasgow, Scotland

BSc in geomatic engineering
Kwame Nkrumah University of Science and Technology in Kumasi, Ashanti, Ghana

*A*S A CHILD, Priscilla Mbama Abasi thought studying science meant becoming a doctor or a nurse, which didn't appeal to her since she hated injections and hospitals. Now she's a GIS technician at Zipline, a logistics company delivering blood, medical products, and vaccines to countries such as Ghana, Rwanda, and the US. Her team works on cutting-edge technology to provide every human on earth fast access to medical supplies and health care. She may not be a doctor, but she still gets to save lives every day. Priscilla says, **“Doing my part to sustain this mission can sometimes be challenging, but that also means I get to problem solve, be constantly on my toes, and be innovative. I love it.”**

Priscilla's responsibilities include mapping the delivery maneuvers of Zipline's drones and making sure their flight paths are free of obstacles. She also supports flight and fulfillment operations with geospatial analysis and maps for data visualization. Passionate about making data accessible and visible to all, Priscilla took the initiative to work with the GIS team to create static and web maps as well as analyze geospatial data. This helps teams such as fulfillment operations and customer experience identify patterns and relationships and make informed decisions.



At Zipline, Priscilla helps plan delivery routes and maneuvers for drones delivering medical supplies.

As an only child, Priscilla says she had to be innovative in seemingly small ways, such as creating imaginary friends to play with. This led her to think creatively, often wondering how existing systems could be improved—a skill that has been handy throughout her career. “My ability to find solutions to solve problems at work is my greatest strength. I am relentless and hardworking, always ensuring that I go over and beyond what is expected of me, no matter how small the task,” she says, although she acknowledges that “because I always want everything to be done well, I sometimes spend too much time going over and over it. However, I’ve learned that meeting deadlines is also a part of doing things well, so I try to find the balance between the two.”

Making space for women

As one of the few women in GIS in Ghana, Priscilla is passionate about creating space for other women to join the field. She supports African Women in GIS, founded by two young women (Cyhana Williams, one of the founders, was profiled in *Women and GIS, Volume 2*) with the main goal of supporting women who are

Fun fact!

Favorite trip: “I took a trip to South Korea in 2008 as part of a team of six to represent Ghana in the annual International Junior Science Olympiad. That was one of the best times in my life and the first time I saw a movie in 3D. I remember the Korean people I met to be very warm and friendly. There was an instance where we went to a park and a woman asked me if I could take a picture with her daughter because she

thought I was so beautiful. Sometimes I wonder if they still have that picture, and I revisit the country through their movies.

“Also, the most memorable and emotional trip I’ve taken was to the Kigali Genocide Memorial Center in Rwanda. It was really touching to see how a country torn apart by a genocide had forgiven itself and had hope for a prosperous future.”



Priscilla hopes to inspire and motivate more women to join the GIS field.

interested in or new to the field and providing a safe space for conversation and discussion. Within this organization, Priscilla manages the social media content team, while also mentoring young women who are interested in the field by providing them with skills to grow their career as well as motivation and encouragement to pursue higher education. “I am passionate about any opportunity to motivate girls to pursue STEM,” she says. In fact, because of the lack of female lecturers in her department and in the college of engineering during her schooling, Priscilla hopes to one day become a professor.

Finding her passion

At university, Priscilla decided to pursue biochemistry, with her parents’ blessing after they initially objected to her studying science, but she was admitted to the geomatic engineering program instead. Though she didn’t like it initially, planning to just become a surveyor because it’s what she was trained to do, she says, “**During my master’s degree in the UK, I gradually realized the enormous**

Tip!

“Be open minded and willing to learn. Think big! Think about going to space; think about building things no one has seen before.”

benefit of geographic information systems in solving problems in my society, and I loved it. I loved giving normal data a face by adding location information.”

During her undergraduate degree, though, Priscilla initially struggled at university. “The difference between my results in my first year and at graduation was just the result of hard work,” she says. She credits her academic supervisors, John Ayer and Dr. Anthony Arko-Adjei, with showing her what it means to work hard—something that pushes her even now. “The thought of being better and knowing more than I knew yesterday drives me to do better, work hard, and achieve more,” she says.

After graduating, Priscilla started as a GIS data manager at a start-up before moving to a GIS analyst position at a tech company that builds geolocation tools for the real estate market. One of the hardest decisions she’s had to make, she says, was deciding to move to Zipline, because she was skeptical of its being a start-up. But it worked out for the better: “This has been the most I’ve grown in my career as a GIS professional,” she says. “I have been supported by my team and team leads to learn new skills and improve the skills I already had. As GIS professionals, we tend to be more tool users than tool makers. So to not be stuck in making the type of analysis where I’m clicking buttons and manually moving things around to complete an analysis, I’m learning Python and other programming languages to help automate my work processes. This way I’m not only working hard but smart.”

Striving for more

Striving to improve and do better is a constant for Priscilla. Having always admired her mother and aunts for their successful careers and ability to also take care of themselves and their families, she hopes to do the same. “I saw firsthand all the effort my mother put into achieving her goals as well as the hurdles she had to jump,



Priscilla at her master's graduation from the University of Glasgow in 2016.

Tip!

“Don’t be afraid to travel any path in STEM that is less traveled by women. STEM will afford you the opportunity to solve problems and impact your society, so embrace it.”



Priscilla speaks at the Nima Startup Summit in September 2020. The event was organized by Developers in Vogue in partnership with Ghana Tech Lab.

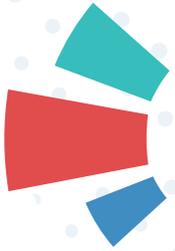
and that has taught me the values of persistence and self-belief,” she says. Priscilla credits her success and career growth to the support of her parents, her loved one, and friends, as well as the Delivery Site Bring-Up and GIS teams at Zipline, who constantly make room for her to learn and grow.

During the coronavirus disease 2019 (COVID-19) pandemic, Priscilla was able to spend time taking a lot of online courses, improving her map-styling skills among other things. And Zipline also made a big impact by delivering COVID-19 supplies in North Carolina and test samples in Ghana. She says, “The pandemic reechoed the popular proverb ‘Make hay while the sun shines.’ Now I try to live to the fullest and make good use of my time.” 🚀

Fun facts!

“I love to read. I love reading all types of genres, but a friend got me to read more books from African writers in 2017, and I’ve been hooked since. I also like to think that I am Beyoncé ... in my dreams.”

Favorite thing about GIS: “The ability to reveal problems through data visualization so that stakeholders can make the right decisions in addressing and potentially solving them.”



ARIANNA ARMELLI

Taking a business risk to help others avoid risk

Position

Cofounder and CEO

Dorothy

Education

Master's in landscape architecture and regional planning

University of Pennsylvania, Philadelphia

Bachelor's in architecture

New York Institute of Technology, Manhattan, New York

HAVE YOU EVER EXPERIENCED a natural disaster such as a flood or wildfire as it was happening or dealt with its aftermath? Those experiences are some of life's most harrowing, and although Arianna Armelli has not directly been caught in a natural disaster, she has been close enough and knows how devastating it is for the people affected.

When New York was hit with Hurricane Sandy in 2012, she says, **"I distinctly remember being able to go to work in Manhattan a week after the storm while friends of mine in the Rockaways were still without power and had lost their childhood homes."** Arianna and her best friend, Maureen, went to the Rockaways a couple of weeks after the storm because a few of their colleagues from school had posted on Facebook that they, and many others, needed help. Armed with a shovel and a sledgehammer, Maureen, who is 5 feet tall, and Arianna, who weighed about 105 pounds at the time, spent the entire day going from house to house slamming through soaked drywall in basements and shoveling debris out of homes. They spoke with some of the families, and every single one of them said they hadn't received aid from the Federal Emergency Management Agency (FEMA) and that their insurance didn't cover floods. Arianna could see that their lives were broken.

Later, Arianna would realize that this wasn't an isolated instance—uninsured home and business owners living and

working in areas at risk of flooding or other natural disaster events was a common scenario. Over the years, she would watch countless storms rip through similar areas in other parts of the country and around the world, all with a headline alluding to ineffective risk maps and massive uninsured communities devastated after a storm. Arianna founded Dorothy, a tech company that collects and transforms data from hundreds of sources, allowing insurers and insurance policy holders to understand the real risk of their policies. “I founded Dorothy because I was passionate about finding a solution to what I recognized as a very serious problem,” she says.

From play builder to architectural professional

Arianna’s mother, Rochelle Shapiro, always said that Arianna would be an architect because she used to spend hours by herself building cities with Legos. “My mom filled an entire bookcase with architecture books before I even got into college because ‘I was going to need it someday.’ Now she sends me articles from *Forbes* and *Entrepreneur* magazine any time they feature a [strong] woman,” she says.

Even more than helping Arianna recognize one of her early interests, her mother had the biggest positive influence on the woman Arianna is today. “It’s not so much anything my mom has said but who she is that has inspired me,” Arianna says. “My mother has always been unashamedly herself in the face of people who wanted her to be something else. Through the 31 years of being her daughter, I have never once seen her cave under pressure or change who she is to accommodate the comfort of a weak person. That single trait has taught me to be strong in a moment of confrontation and patient in the face of difference.”

Arianna grew up in a small apartment in the Bronx with a working-class family that was basically happy and modest. In high



Arianna, left, and her friend Maureen help homeowners in the Rockaways after Hurricane Sandy in 2012.

Fun fact!

“I have always been conscious of my fitness and usually maintained my well-being through active workouts, either cycling or weightlifting. During the pandemic, I found that my regular routine was no longer possible, so I took up running, yoga, and meditation. I feel like I’m a bit late to the party, but it changed my life.”

school, she started exploring the architecture field by taking AutoCAD classes and getting involved in housing design projects. She continued that interest into college at the New York Institute of Technology in Manhattan, New York, where she studied urban design. She became fascinated by city planning because city design was the outcome of politics, economic interests, and industry forces. Her focus was primarily on large-scale designs located in or near flood zones.

Her parents worked incredibly hard to provide her with an education that they didn't have the opportunity to pursue while they were growing up. They paid for her first year of private college until they could no longer afford it. Arianna paid for the rest of her education herself and built a decent savings account based on her architecture income. Her parents taught her how to value money and the hard work that came with it. "I was taught that there's no reward without risk, and if you have the luxury to coddle failure, you'll never truly feel the gift of success," she says.

College is where she met all her closest friends; it is also where she met one of her most influential teachers, Giovanni Santamaria. She found herself involved in Giovanni's urban design thesis, which was a year-long study focused on the rejuvenation of postindustrial landscapes. The thesis involved intense research starting with geopolitical forces that trickle down into the economies of cities and how those geopolitics influence design and infrastructure. "Giovanni taught me to question the obvious and to solve large problems through analytical approaches," she says. "He has been a mentor to me for 10 years now, and whenever I need his advice or input, he never lets me down."

Arianna's father died unexpectedly the year she graduated from college, and his death harmed her family financially. At the time, it was important for Arianna to build stability with her career, so she lived at home and helped where she could.



Arianna and her father, Joseph Armelli, at her graduation from New York Institute of Technology in Manhattan.

Fun fact!

"When I was 26, I booked a solo trip across Eastern Europe. I traveled through Austria, Hungary, Poland, the Czech Republic, and Slovakia. My father's side of the family is from Italy, and I had been there many times. This trip was my chance to visit my mother's side and travel to all the places my ancestors fled during the Holocaust. I visited ancient synagogues in Austria and concentration camps in Poland. It was a trip I wanted to take alone and one that I will never forget."



During her last year of college, she began her professional career as an intern at a small architecture firm in midtown Manhattan that primarily focused on mixed-use residential and commercial developments along waterfronts. The position she was offered after graduation came from part luck and part personal ambition. "I was 22 and wanted to lead a new 1.6 million-square-foot project they just got in the door that would take up an entire city block in Queens. I was young and eager and in over my head," Arianna admits. She spent the next six years developing that project from sketch to structure, working with mechanical, structural, and civil engineers, contractors, and the city government. She remembers, "The entire project felt like a never-ending problem that had to be solved, whether it was zoning changes, building department approval, community board input, FAA restrictions, underground parking structures that were 30 feet beneath the water table—every day was a newer, harder problem that needed tending to. In six years, I learned how to solve massive problems on the daily, but most importantly I learned how to build nothing into something."



Top: Arianna with Prague behind her during a meaningful trip to Eastern Europe.

Bottom: Arianna's journey started in Budapest, Hungary, and ended in Warsaw, Poland.

Arianna and her mother, Rochelle Shapiro, at Arianna's graduation from the University of Pennsylvania.



Grad school and Arianna's first company

Arianna left her architecture job in June 2016 and began grad school at the University of Pennsylvania in August. Her program focused on large-scale regional planning with an emphasis on sustainable design approaches that integrate landscapes. She decided to attend grad school for a couple of reasons: (1) she already knew she wanted to start her own business and wanted to build a more diverse network of colleagues from other professions, and (2) she knew she needed to know more about business and engineering and made a concerted effort to fill her electives with classes outside the design school, including as many engineering and business classes as her schedule allowed. When she came up with the initial idea for Dorothy, she was able to use all the university's entrepreneurial resources, which included incubation hubs, start-up grants, and co-op working space at the Pennovation Center.

Just before she started grad school, Arianna founded her first company, Nativah Chaya. She initially started it after completing

a 50-mile bike ride through the five boroughs in New York City, which she now calls her bridges tour. “The morning of the ride, I woke up with the intention of biking to the High Bridge over the Harlem River—it had just reopened as a pedestrian overpass after some 30 years of being closed to the public,” she recalls. “It was such a beautiful day that once I got there, I felt I should explore more. That day I cycled past every bridge connecting to Manhattan. Chaya is my middle name, which means life in Hebrew. *Nativah Chaya* means paths of life. I had learned the figure-ground method of mapping in undergrad and utilized GIS systems and code to allow individuals who wanted to commemorate a special journey or achievement by syncing their fitness app with my mapping designs. While my intention for Nativah Chaya was to create a unique project, the company would later support most of my expenses during grad school and provide income during the early stages of a bootstrapped Dorothy.”

Jumping into innovation and the unknown

In 2017 after several hurricanes landed in Texas and Puerto Rico, Arianna read in the paper that “about 80 percent of Hurricane Harvey victims” did not have flood insurance and faced huge bills (*Associated Press*, August 29, 2017). Many of those homes fell outside the federally backed flood zones, according to the story that appeared in *USA Today*. At this point, she realized urban design was a long-term solution to a short-term problem and that she did not want to spend her career working on one project that would affect only hundreds of people. She wanted to come up with a solution that could affect hundreds of thousands of people in real time. So she shifted her focus to technology and began researching how FEMA flood maps were created and why their technology was providing such conservative risk assessment.



Arianna memorialized her 50-mile bike tour through the five boroughs of New York City, which became her inspiration to start her first company, Nativah Chaya.



Arianna knew that solving problems at someone else's company was not going to be enough. She wanted to start her own business focused on solving problems that make a difference in people's lives.

Even though she knew that she wanted to start something on her own, Arianna still feared the lack of stability that she would otherwise get from a steady job and income. “The hardest choice, which ultimately became my sacrifice, came when I decided to jump, not just talk about it,” she says. “I financed Dorothy with my entire savings and relied on my own confidence in myself to make it happen. **Entrepreneurship is certainly a journey of high highs and lower lows, yet persistence and patience have pushed this company forward, and the feelings of accomplishment after doubt are incomparable to anything I've ever experienced.**”

Dorothy's core technology focuses on producing more accurate predictive analysis for natural disasters and streamlining the coverage process for disaster insurance. For example, the technology that Dorothy uses mapped flood damage from Hurricane Harvey 60 percent more accurately than standard flood maps, she says on riskandinsurance.com. Considering the increase in climate-related storms, as well as their severity, Arianna and her company use historical reference as a data point but say that it should not be the sole source of risk-based assessment.

If Arianna had listened to all the people in her life who told her no or said that it's going to be too hard, she wouldn't be where she is today, she says. Today, she is the CEO of a funded company with what she calls a phenomenal team that solves problems they care about. Yet she appreciates the educators who discouraged her because it made her work a little harder to prove them wrong. She knows how hard she is willing to persevere. “I never quit,” she says. “Success is very simple to me. It is the ability to achieve everything I want with my career while providing for the people I love along the way.”

As Arianna pursues a goal she is passionate about, she deals with all the feelings that come with building something from nothing. It's a lot of responsibility, and she constantly wrestles with the fear of failure, she says. But she learned valuable financial lessons

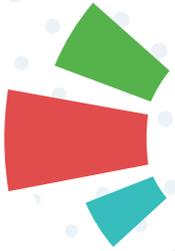
Fun fact!

“Before the pandemic, I was 110 percent focused on my job. It was the only part of my life I catered to with unlimited devotion. Through COVID-19, I learned that type of lifestyle is not sustainable and that the most important part of life is living it. I have taken the time to slow down and appreciate the journey while

making a concerted effort to spend time with the people I care about. Don’t get me wrong – building my business is still my number one priority, but it is also possible for me to spend time in the present without emotionally paralyzing myself with thoughts of work that still needs to be done. Meditation helped with this.”

at home and applies them daily. Plus, she possesses an unwavering ability to persevere.

“I would encourage young women to pursue a career in STEM simply because there are limitless opportunities for professional autonomy and financial independence,” she says. **“If you are like me and crave the freedom to explore a path of the unknown, aka entrepreneurship, a career in STEM will foster the technical foundation to achieve those goals. I feel no regret for leaving what could have been a very successful career to focus on building something myself and would urge others wrestling with the same thoughts and feelings to do the same.”** 🗨️



MARYGRACE BALINOS

From imagined cities to real solutions

Position

Freelance GIS specialist and entrepreneur
Valdivia, Chile

Education

Postgraduate diploma, energy efficiency and environmental quality in construction
Universidad Austral de Chile, Valdivia

MS, regional development planning and management
Universidad Austral de Chile, Valdivia, and TU Dortmund University, Germany

BS, civil engineering
University of the Philippines, Los Baños

WHEN MARYGRACE BALINOS wanted to join an art club in high school, she had to demonstrate her talent by drawing her vision of the future. She still remembers “the spontaneity of the colors and lines of the skyscrapers” that she drew in her imaginary city. For a while, she thought she might pursue a career in the arts, but encouraged by her mother, who was a college math instructor, she chose instead to become a civil engineer. She discovered GIS while studying at the University of the Philippines, and today, among other projects, she is working on a smart city system in Valdivia, Chile, applying her vision and her skills to transform a real city into a city of the future.

In 2018, with a small team, Marygrace submitted an innovative idea for the Smart City challenge organized by InnovING 2030. Her proposal for an open-source smart system to monitor the municipal waste collection in the City of Valdivia was selected, and the team is currently finishing the mobile and web app prototype, Ciudad Limpia. In addition to monitoring, the system is designed to promote a circular economy and the reporting of unregulated dumping. “One of the social implications of the project that we envisioned is bridging the communication between the municipality and the community,” Marygrace says. “The project development coincided with the social transformation that is happening in Chile (university strikes, citywide

demonstrations, social unrest) and very much evident in Valdivia, in addition to the current health crisis—the COVID-19 pandemic. Thus, finishing the prototype has been a challenge, too.” Ciudad Limpia was expected to launch in 2021.

Discovering GIS

It’s a long way from the Philippines, where Marygrace was born, to Chile, where she works as a freelance GIS specialist, currently making maps for a proposed national park management plan in Northern Chilean Patagonia. Her journey began during her undergraduate years, when she worked as a student assistant at the GIS-IP Laboratory at the International Rice Research Institute in Los Baños, Philippines. “My first task was to digitize paper maps using a digitizing board and ArcInfo software,” she recalls. “It was a new technology for me, and that started my interest. By the way, one of my direct supervisors was a woman.”

Marygrace notes that she was surrounded by women in her formative years and that almost all her immediate supervisors when she started working were women. And, she says, “My mom is the woman I admire the most. She was hardworking, very good at her craft, and sacrificed a lot for us, her children. She always told us the importance of education, being kind to others, and to always have faith in God.” Apart from her family, Marygrace credits her “closest and dearest friends in college” for supporting her. “We did a lot of fun and interesting activities and group studying together,” she says, “and I love and appreciate them very much.”

After graduating and qualifying as a licensed civil engineer, Marygrace worked for a private construction company in the Philippines, where she applied her GIS expertise and spatial thinking to real-world problems for the first time. “One of the challenges we faced was coordinating with the site and planning the optimal route for the trucks that carry the construction materials from the



Marygrace, *right*, and her mother at the oath-taking ceremony for new civil engineers in Manila in 2003.

warehouse to different construction sites,” she says. “It was a small thing, but I was proud of it, since most of what I knew was theoretical, and at that moment, it was a real situation. Acting quickly to resolve issues, taking into account the security of our coworkers, is very important in that line of work.”

A growing interest in urban planning led to a postgraduate diploma, and then what she describes as a wonderful opportunity. On her second try (“Perseverance is one of my strongest traits,” she says), Marygrace was awarded a scholarship to an international master’s program in regional development planning and management, known as the SPRING—Spatial Planning for Regions in Growing Economies—programme. She completed her first year of study at Technische Universität Dortmund, Germany, and the second at a partner institution, Universidad Austral de Chile.

A difficult decision

Although she had been living away from home since college, the decision to leave the Philippines was difficult and came at significant personal cost. “The hardest choice that I had to make was to leave my family to study abroad,” she says. “I asked Mom for some guidance, and she was convinced that I should continue that path. The last time I hugged her was when she was sending me off at the airport. After about six months, my mom passed away due to an accident.”

The sacrifices Marygrace made to further her education were real, but so too were the professional opportunities and avenues for entrepreneurship that she has encountered in Chile. After finishing her postgraduate degree, she continued working in Chile as a civil engineer in the public sector and as an academic assistant, coteaching the GIS coursework in the master’s program she graduated from. Then she spent eight years working as a GIS assistant and later as a spatial planning technical officer for an international NGO focused on environmental conservation.



Marygrace's family, with her mother in red, sending her off at the Ninoy Aquino International Airport in 2006 to study in Dortmund, Germany, for her master's degree.



Marygrace at Machu Picchu, Peru, in 2008.

Fun fact!

Favorite trip: "Traveling to Cusco and Machu Picchu in Peru. In the engineering library of my college, I used to go and skim through old civilization atlases and admire the structures built during that period, and one of them is Machu Picchu of the Inca Empire. Being there was just so surreal—we waited for sunrise, and as the fog subsided, the city emerged. Breathtaking!"



Marygrace in Concepcion, Chile, in September 2019, inviting Chile student members of the Institute of Electrical and Electronics Engineers to the 2020 Latin American Geoscience & Remote Sensing Society and International Society for Photogrammetry and Remote Sensing conference.

DondeLaViste?

While working for the NGO, Marygrace came up with an idea: Why not create an app so that members of the community could use their smartphones to report their sightings of various species and, in this way, register them for geotagging? The proposal was funded in 2016, focusing on marine fauna, and, Marygrace says, “I was really happy that the idea became a reality. The mobile and web app is called DondeLaViste?, a collaboration between the NGO and the academic community. At present, the app has about 1,063 installations and more than 500 sightings registered, and it also has the support of the Ministry of Environment.” The community sightings, once submitted, are validated by species experts, and beyond geotagging, the project aims to protect the species through environmental education and sustainable special-interest tourism.

A brave move

In late 2019, Marygrace took a leap of faith and decided to become a freelancer. “It was a brave move on my part,” she says, “and it was not easy, especially now with the pandemic, but the journey was interesting.” She upgraded her skills by taking online courses in

Fun fact!

“I make jewelry as a hobby and joined an exhibit showcasing our jewelries with recycled metals. I took a wood carpentry course and made my own shelf without using nails. I also took sculpting classes and created a foot-tall clay sculpture of a penguin.”

R programming and teaching herself Python and CSS. “There were a lot of firsts, like applying for a start-up and participating in an international innovation technology competition co-organized by the GEO-Land Degradation Neutrality (GEO-LDN) initiative and the United Nations Convention to Combat Desertification with the support of my husband, who is also a partner in our small company,” she says. She was thrilled when their proposal, Land Use Planning assistant (LUPa), was selected as one of the competition’s semifinalists.

As she looks toward the future, Marygrace is motivated by the motto that has inspired her personal and professional journey thus far: “I can do it!” It’s an attitude that she would like to pass on to other young women considering a career in STEM. “STEM is as fun as any other fields,” she says. “Engineering is an area of study where we can imagine, create, and invent a lot of things that not only help in our everyday lives but may also have a great and positive impact in our society. We have equal skills to men’s. It is only a matter of perspective and training. Believe in yourself! If we want to do it, we can achieve it.” 🚀



“I can do it!” Marygrace participating in an interschool gymnastics competition in the Philippines in 1989.